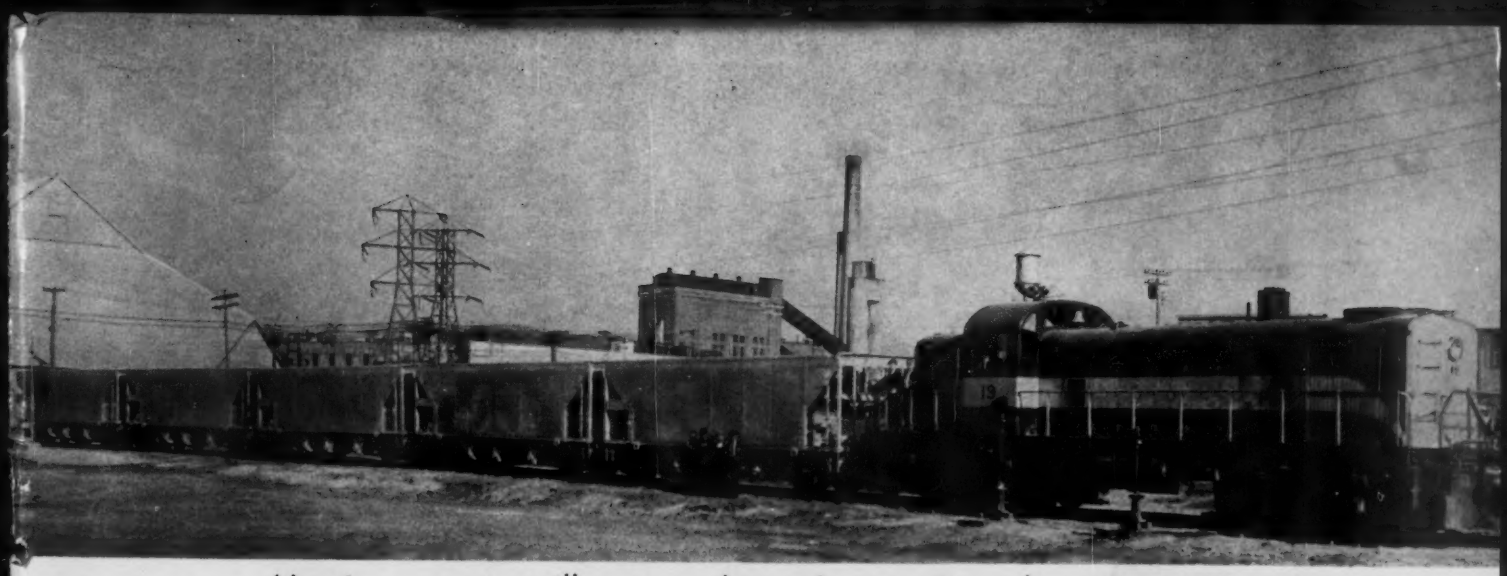


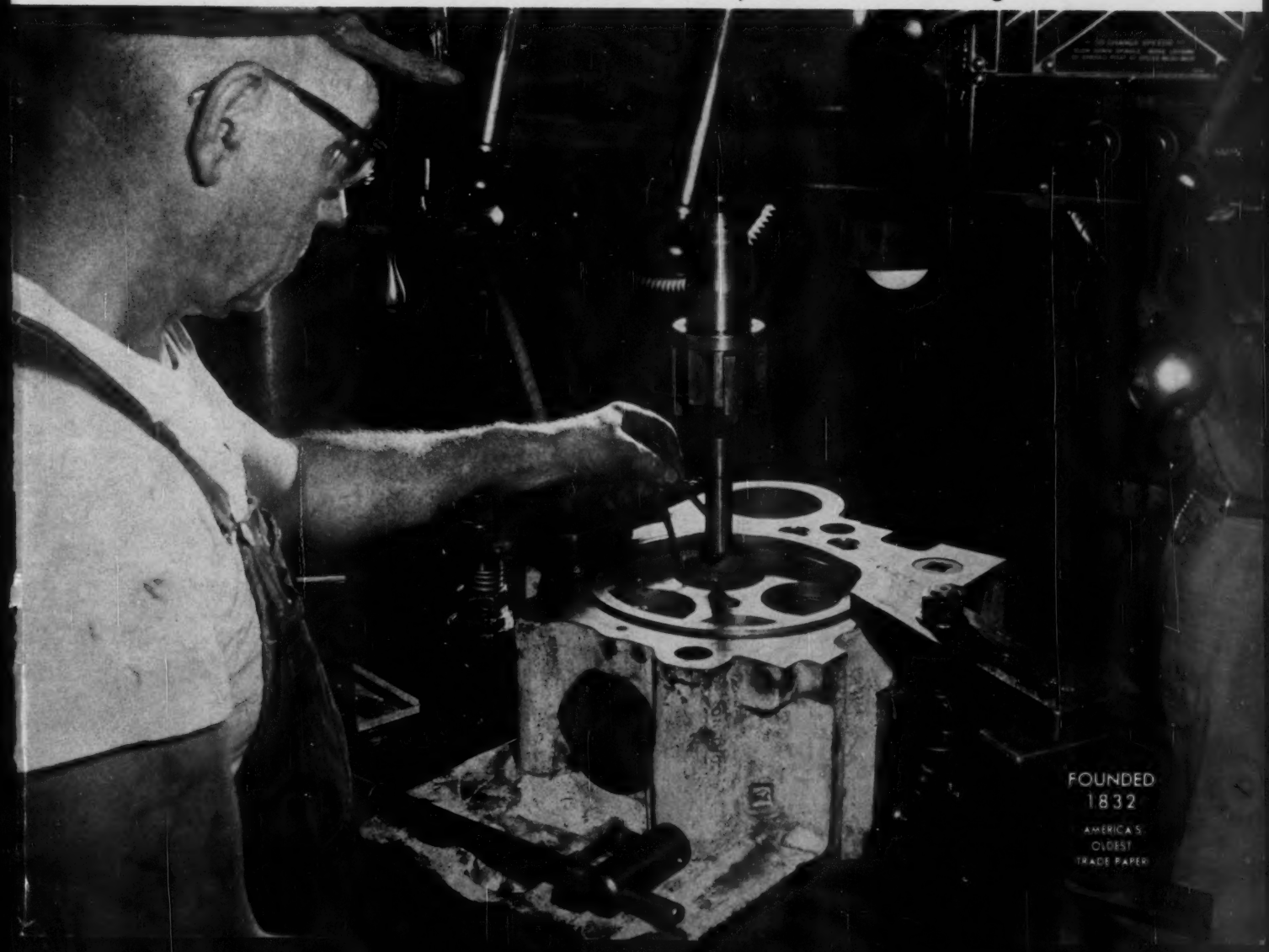
Aluminum center sills prove themselves in Canada... Page 25

RAILWAY

LOCOMOTIVES AND CARS

A SIMMONS BOARDMAN TIME-SAVER PUBLICATION FEBRUARY 1958

Reclamation: How Missouri Pacific does cylinder heads... Page 34



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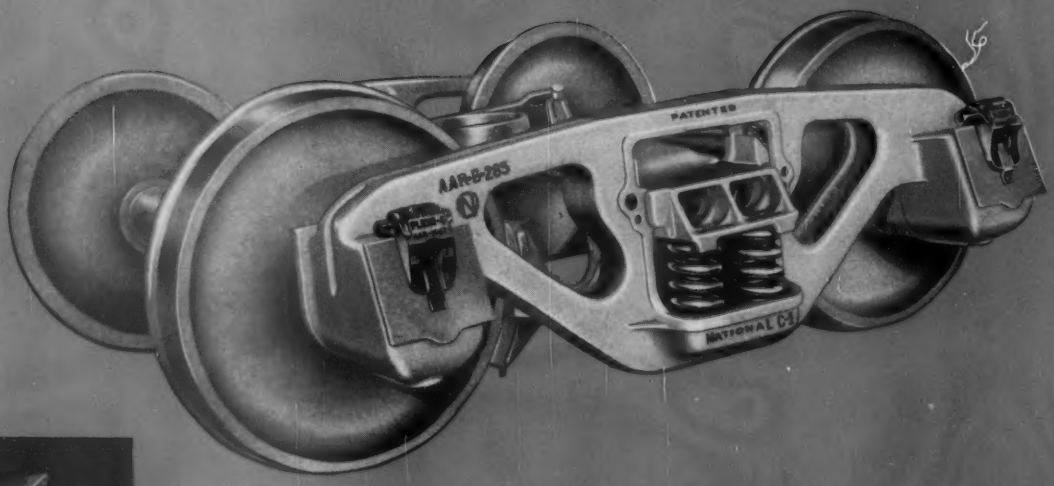
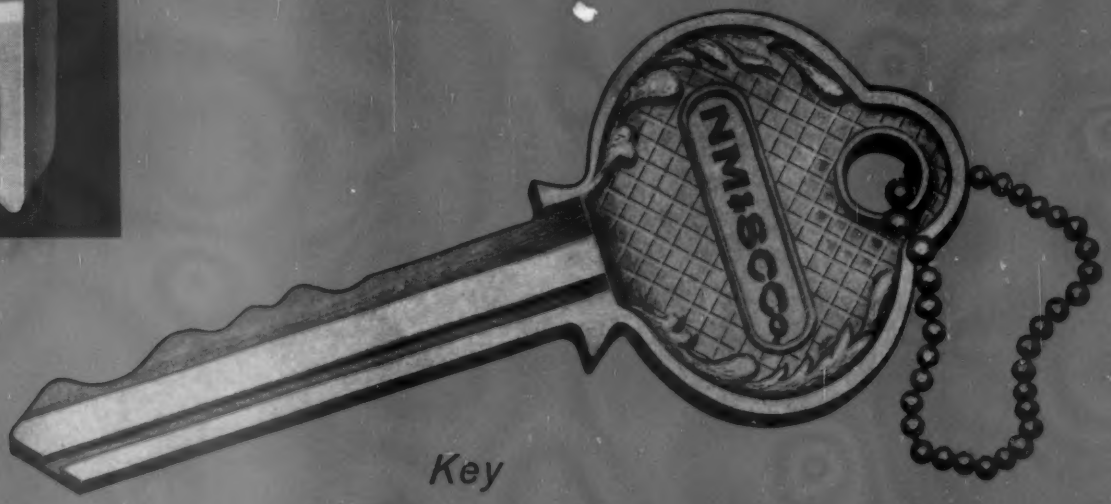
AMERICA'S OLDEST TRADE PAPER



THE WEDGE



Key

to lower maintenance in

NATIONAL C-1 TRUCKS

In National C-1 Trucks, longer wedge life results from design of the friction mechanism itself, and the special analysis materials of which the wedge and wear plate are made.

Actual service records on leading railroads prove that National C-1 Truck Wedges are still in prime condition—even after traveling the equivalent of 8 times around the world.

NATIONAL
SPECIALTIES

COUPLERS
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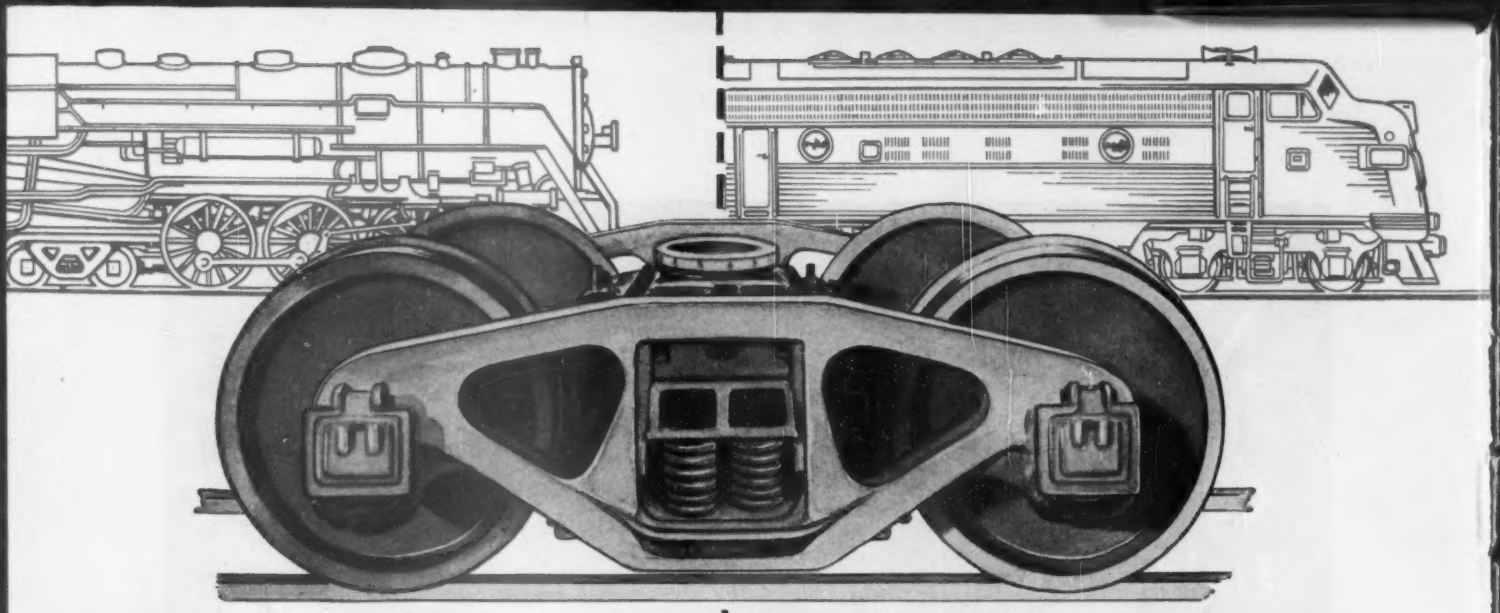


The Old and the New...

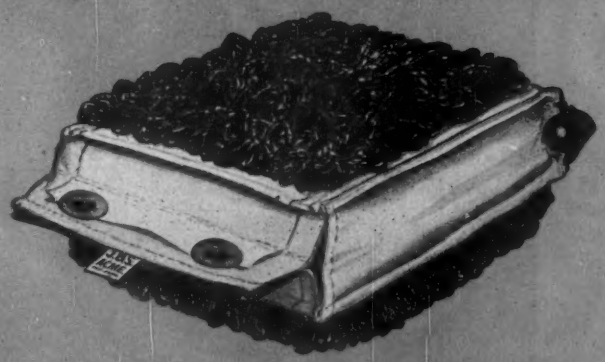
..from waste to JBS

ACME JOURNAL LUBRICATORS

A Great Step Forward!

With waste gradually being discontinued in journal lubrication, the change-over to a better type of lubricator raises certain questions: what type should it be; what qualities should it possess; what kind of a performance should be expected of it? To help you decide, consider what the JBS Acme Lubricator offers and compare it with any other lubricator. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

Write Today for Detailed Information and Folder



- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

GUARANTEED Quality, Workmanship and Material as represented

*Patent applied for

JOURNAL BOX SERVICING CORP.

"30 Years in Car Lubrication"

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RAILWAY
LOCOMOTIVES AND CARS

The Oldest Trade Paper
In the United States

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TIME-SAVING IDEAS FOR **FEBRUARY 1958**

Volume 132 • No. 2

MOTIVE POWER AND CAR

ELECTRICAL

DEPARTMENTS

LOCOMOTIVES AND CARS WHAT'S NEW IN EQUIPMENT

Grain Door

This Acme steel door consists of a waterproof laminate of high strength burlap and paper supported vertically by steel slats. The steel slats and the laminate are securely attached to wooden members at top and bottom, commonly known as climb-out and pry boards. This fully factory assembled door rests against, but is not attached to, horizontal steel beams. The doors come in two heights: the 6-ft grain door, using two steel beams, and the 8-ft mail door, using three steel beams. The double steel reinforcement of the Acme door prevents all contact with the car door.

According to the manufacturer, one man can cooper a car (two doors) in 10 min. The door comes down in one piece, leaving no strapping on the door posts or walls of the car.

There is a major reduction in damage to walls and posts because only 20 nails per car are used with the grain size compared with a minimum of 135 per car with the paper door. The beams are reusable. *Acme Steel Company, Dept. RLC, 135th st. and Perry ave., Chicago 27.*

Desludging Cleaner

Magnus RR-737 has been developed for the removal of sludge accumulations in railroad diesel engines prior to general overhauls. This field-tested chemical celaner has proved successful in General Motors, Alco, and Lima engines. It removes lacquer-type sludge as well as soft sludge deposits from crankcase, oil passages, oil coolers, filter compartments, piston ring grooves, and working surfaces of moving parts on the top deck.

The complete cleaning operation is accomplished without dismantling any part of the engine. A short down time is required for desludging in comparison to disassembly and hand cleaning. Magnus RR-737 can be reused at least three times, provided sludge and solid contaminents are removed from the bulk of the solution by settling or by centrifuging. It is supplied ready for use. *Railroad Division, Magnus Chemical Company, Dept. RLC, South ave., Garwood, N.J.*

Reciprocating Tool Grinders

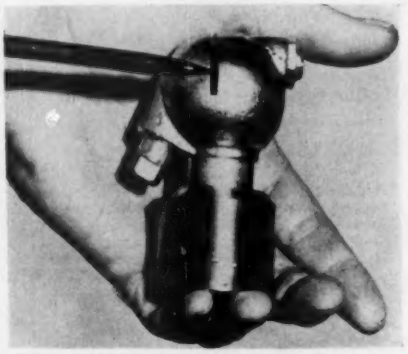
Two models of off-hand tool grinders of the double-end, reciprocating type are designed to perform two jobs—conventional grinding at one end and chip-breaker grinding at the other. The grinders have adjustable, power-controlled reciprocation of the grinding wheels so the operator only need hold the tool at the preset angle. A vertically adjusted table beneath the reciprocating chip-breaker wheel accommodates an adjustable tool block fixture which holds the tool in place while grinding the desired angle on the chip-breaker groove.

Other features include variable stroke, variable reciprocation, and motorized precision grinding spindle. *Ex-Cello-O Corporation, Dept. RLC, 1200 Oakman Blvd., Detroit 32.*

Compressor Lubricant

Pydraul AC is a fire-resistant synthetic lubricant for air compressors. Carbon desposits on exhaust valves and in interstage equipment are said to be reduced with the lubricant's use. Some users of the fluid are reported to be obtaining 15 to 20 times longer operation between clean-outs of their air-compressor systems.

By minimizing carbon and resisting oxidation, Pydraul AC also serves to eliminate what are believed to be the causes of explosions and receiver fires in air-compressor systems. The auto-ignition temperature of the fluid is greater than 1,100 deg F. Lubricating qualities are equivalent to high-grade petroleum oils. *Organic Chemical Division, Monsanto Chemical Company, Dept. RLC, St. Louis 24.*



Rotating Spray Cleaner

This unit, designed specifically for cleaning tank truck compartments up to 12 ft long, may be adapted for other similar cleaning operations.

Spray-O-Mat is a portable unit, weighing only 7 lb and measuring less than 2½ in. in diameter. It is carefully engineered of stainless steel and consists of a hydraulically propelled rotary head which turns on a self-cleaning, hardened stainless-steel ball race. The spherical head is fitted with one wide angle nozzle and is slotted to provide three-directional spray. An adjustable offset jet permits spinning of the spray head. The unit is fitted with a length of ¾-in. brass pipe, threaded to accommodate solution hose.

The unit requires a minimum of auxiliary equipment: pump, pipes and valves, solution and drain hose, and heated solution tank. The pump should be capable of discharging 40 gpm at a head pressure of 60 psi. Rotating speed of the Spray-O-Mat should be about 60 rpm. *Oakite Products, Inc., Dept. RLC,* 146 *Rector st., New York* 6.

(*Continued on page 18*)

USG® BRUSH GRADES AY 32 AND 2306

service proved for diesel main generators

USG Brush Grades AY 32 and 2306 have proved their high performance in main generators on Diesel-electric locomotives in every type of service. Because of longer life USG Brushes actually reduce down time due to generator overhaul. Brush replacement as well as commutator wear is held to a minimum. A performance test on your equipment will prove that USG Brushes will give you superior commutation and longer service life. Only USG Brushes have Statite® . . . the permanent shunt connection that cannot be pulled out or jarred loose. Statite retains its original low millivolt shunt drop. Now's the time to try USG Brush Grades AY 32 and 2306 with Statite connections that have never failed in millions of miles of railroad service! Why not order today?

Send for the latest USG Brush Catalog B-56 and the new USG Brush Grade List, both are excellent for designing or for specific applications.

223

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW 13, MICHIGAN

SHIPPER

another revenue-building

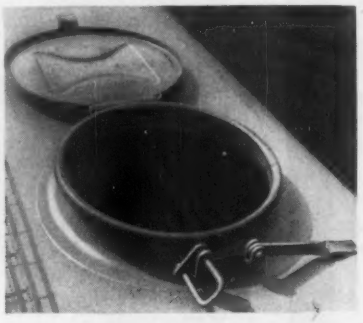
Shipper acceptance is the mainspring of railroad revenues. The levels of dependability, speed, load-carrying versatility and economy which your railroad offers, build this vital acceptance. *Your* selection of rolling stock that meets these requirements is the most important decision in this acceptance-building process.

Representative of P-S Standardized Freight Cars—the rolling stock *best* able to meet these shipper requirements—is the PS-2 Covered Hopper. Its fine performance under all railroading conditions is typical of the rest of the Pullman-Standard line: the PS-1 Box Car, PS-3 Open Hopper, PS-4 Flat Car and PS-5 Gondola.

Write for copies of the P-S Freight Car Booklets shown at right or contact your Pullman-Standard representative. See how you can use the modern facilities, craftsmanship and know-how of Pullman-Standard standardized carbuilding to insure shipper acceptance.

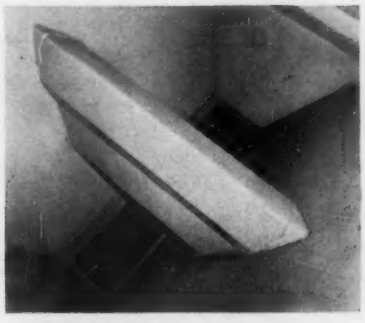
The PS-2 Handles Lading Fast

Shippers like the ability of the PS-2 to handle lading in a hurry. Circular hatches make loading or unloading from the roof quick, safe and easy. The flow of lading can be directed from the security of the unobstructed running board. Hatch location allows loading without developing voids or air pockets. Smooth interior and chute design speed lading flow to gates.



Keeps Lading Clean, Safe, Dry

The rugged design of the PS-2 surrounds lading with durable protection. All-welded construction eliminates joints and ledges that trap dirt. High, circular hatch coaming has reverse curved lip . . . diverts dirt and rain. Hatch covers have center pressure locking arrangement . . . make secure seal with coaming lip. P-S discharge gates seal and lock, lading is completely safe.



And PS-2 is Self-Cleaning

The key to the self-cleaning ability of the PS-2 is the all-welded design which provides an extremely smooth car interior. Properly sloped hopper sheets allow maximum free fall of lading to gates. The welded interior speeds clearing because there are no ledges, laps or pockets to trap lading. PS-2s empty faster, need little clean-up . . . they're back in service sooner.

THE WORLD'S LARGEST BUILDER OF ROLLING STOCK

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 NORTH LASALLE STREET, CHICAGO 1, ILLINOIS

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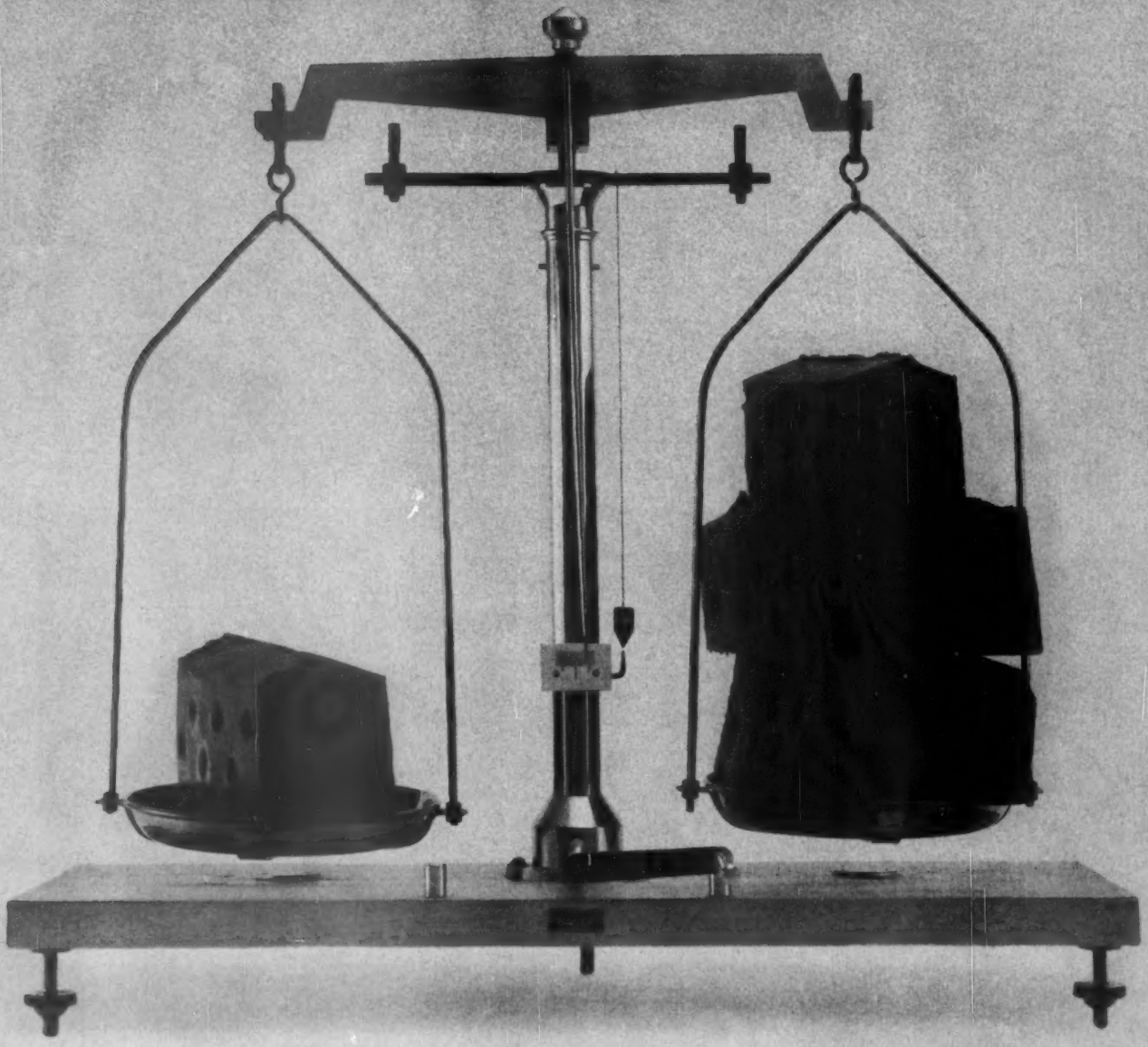
ACCEPTANCE

benefit of P-S Standardized Freight Cars



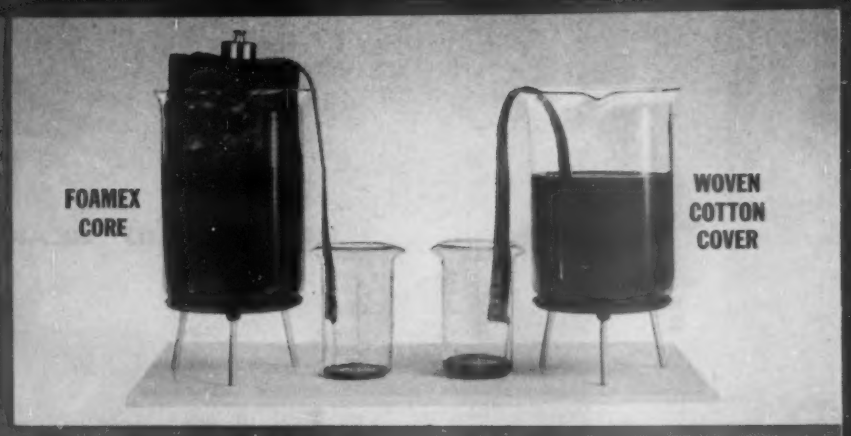
oil-soaked core

dry cores

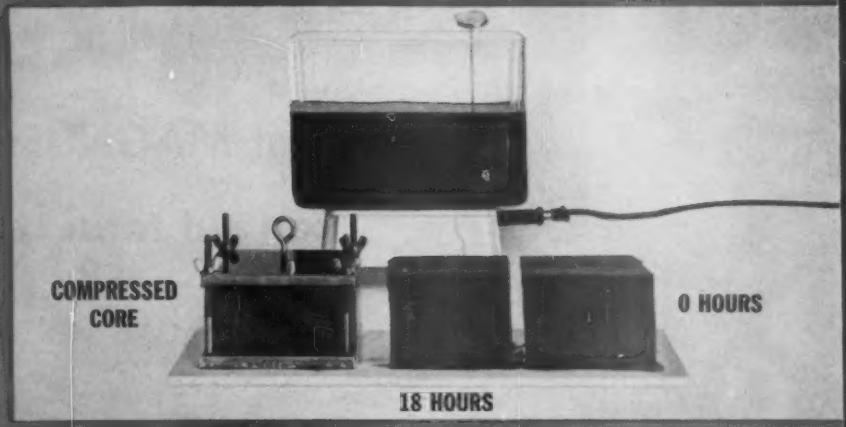
Why Redipak Twin Pads with Firestone* FOAMEX® provide superior lubrication

Redipak's Foamex core holds over 5 times its weight in oil!

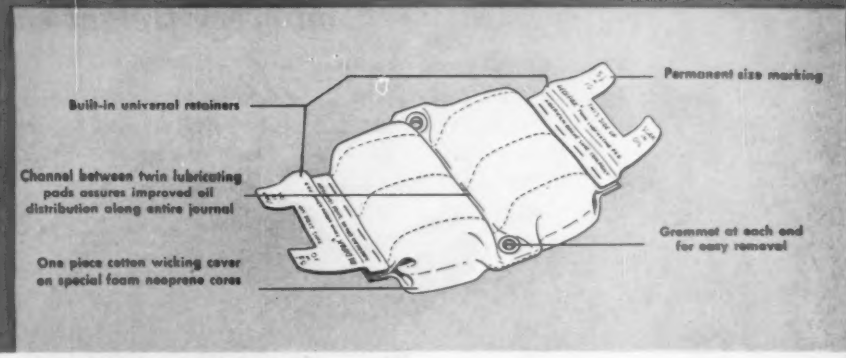
Redipak Twin lubricating pads hold an amazing amount of oil. Why? Mainly because of the Foamex core with its millions of interconnected cells. One sample of oil-soaked Foamex weighs as much as five and one-half dry samples of the same size . . . in other words five times its own weight in oil! Thus, the Redipak Twin core provides a generous oil reservoir—even when there is accidental loss of free oil.



BOTH CORE AND COVER WICK OIL! Both the cotton cover and the Foamex core in Redipak Twin lubricating pads move a steady flow of oil to the journal. The woven cotton cover, unmatched in wicking ability, is lint-free. The foamex core not only provides the proper resilience, but it too wicks oil when saturated . . . all adding up to doubly effective lubrication!



REDIPAK TWINS KEEP THEIR SHAPE. The Foamex cores in Redipak Twin lubricating pads are produced to our physical specifications to resist taking a set under extremes of temperature. In this demonstration, adapted from actual production tests, one of two identically-sized samples has been compressed to 80% of its original height and immersed in oil at 250F for 18 hours. At the end of that time, there was no difference in height between the tested sample on the left and the untested sample on the right. Despite compression under heat, the Foamex core held its shape!



Superior lubrication that will effectively control hot boxes is assured with Redipak® Twin lubricating pads, because of their unique design and the excellent lubricating properties of their woven cotton covers and Firestone Foamex cores.

Take the Foamex core . . . more than just a mechanical filler, this material, which is produced by Firestone to our physical specifications, actually wicks oil when saturated, holds over five times its own weight in oil, and keeps its shape and resiliency under extremes of temperature.

The wicking ability of cotton hardly needs explaining. When woven into a seamless cover for Redipak Twin pads, the result is a highly efficient wicking material that will not lint or glaze. Add to these properties, a unique design that provides superior oil distribution and positive shift prevention and you have Redipak Twin lubricating pads.

**A special formulation of Foamex is used for Redipak Twin pads*

AMERICAN Brake Shoe COMPANY

RAILROAD PRODUCTS DIVISION

530 Fifth Avenue • New York 36, New York

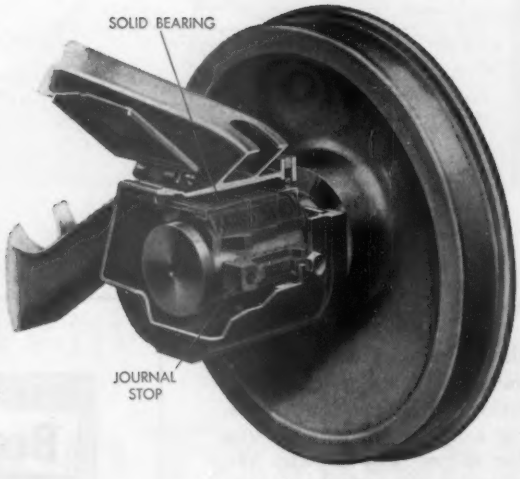
In Canada: Canadian Bronze Co., Ltd.

HOW SOLID BEARINGS AND JOURNAL STOPS HELP

It's a fact...

that MAGNUS R-S JOURNAL STOPS can cut total bearing operating costs to less than 13 cents per car day!

Here's the low-cost way to get better bearing performance fast—save almost $35 per year now on every freight car equipped with Journal Stops



Railroads using R-S Journal Stops today save about $35.00 per car year in reduced operating costs alone —fewer hot boxes, longer bearing and axle life, and reduced service attention. They save the complete cost of the R-S Journal Stops, including installation, in less than 3 years — bring the total cost of solid bearing operation down to less than 13¢ per car day.

That's just one of the facts about low-cost solid bearings with R-S Journal Stops — proved now on over 5000 cars in service. Potential savings are even greater. That's because R-S Journal Stops stabilize the bearing assembly, give the low-cost solid bearing a chance to work at optimum efficiency. That cuts truck maintenance costs all along the line. It

MAGNUS METAL CORPORATION

KEEP RAILROADS OUT OF THE RED

assures the practicability of 3-year repack intervals and reduces the requirements for an effective rear seal.

And with R-S Journal Stops you still have all the advantages which low-cost solid bearings bring to railroad rolling stock. You can take the maximum load, make the fastest schedule. You save excess dead weight and get lowest possible running resistance in pounds per ton. Best of all, you'll be sure of the kind of bearing performance you want at a price you can afford to pay.

Write us for *all* the facts. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

EXAMPLES OF ANNUAL SAVINGS IN BEARING MAINTENANCE WITH R-S JOURNAL STOPS

Description	Without Stops	With Stops	Savings
Repairing Hot Box Set-Outs ...	$9.05	$0.91	$8.14
Damage to Equipment	2.01	.20	1.81
Fires Due to Hot Boxes	.29	.03	.26
Cut Journals	1.35	.34	1.01
Defective Brgs., Routine Insp. .	2.69*	1.35	1.34
Routine Yard Inspection	40.82	24.11	16.71
Material—Not Included Above			
Defective Bearing Replacements	4.36*	2.18	2.18
New Axles	3.35	.84	2.51
Spring Packing Retainers	.46	.00	.46
		TOTAL SAVINGS	$34.42

**Technical Advisory Committee figures. Other figures in this column based on 1954 costs as determined by AAR.*

MAGNUS

Solid Bearings

RIGHT FOR RAILROADS
... In performance ... In cost

Subsidiary of **NATIONAL LEAD COMPANY**

LOCOMOTIVES AND CARS REPORT FOR FEBRUARY

Keller Becomes AAR Vice-President—Research

W. M. Keller

F. Peronto

F. H. Stremmel

William M. Keller, assistant vice-president operations and maintenance department, Association of American Railroads, Chicago, has been elected vice-president—research, to direct Association of American Railroads research activities relating to the engineering, mechanical and electrical fields. Fred Peronto, secretary of the Mechanical Division, has been appointed executive vice-chairman of the division. L. T. Donovan, assistant to executive vice-chairman, is now assistant executive vice-chairman. Frank H. Stremmel, assistant to secretary, succeeds Mr. Peronto as secretary.

"Big Jawn" Is Gone

Norfolk & Western experimental locomotive 2300, known as "Big Jawn" and "Jawn Henry," has been permanently retired. Railroad mechanical men said maintenance costs of the 4,500-hp coal-fired steam-turbine-electric had become prohibitive, even though it burned some 30 per cent less coal than conventional locomotives. They said the principle of using coal as a fuel in such an engine was proved, regardless of component deficiencies.

Experience gained from close and continued performance study led to the belief that a more economical and dependable coal-burning steam-turbine locomotive could be designed and built. Locomotive 2300, one of the largest steam locomotives ever built, and the joint project of the road, Westinghouse Electric, Babock & Wilcox, and Baldwin-Lima-Hamilton. It was delivered to the N&W in May 1954. Serious difficulties were encountered in the electrical, feedwater and turbine components. The complexity of the control system and of the locomotive generally combined to cause an excessive number of failures which often took it out of service.

In-Date Air Brake Stenciling Required

The General Committee of the AAR has approved a recommendation of the Committee on Brakes and Brake Equipment affecting all cars which receive in-date air brake testing while on repair tracks. Stenciling or marking is to be applied as soon as possible on either side or end of reservoir which includes "I.D. S.C.T. (In-date Single Car Test), plus abbreviated initials of the shop or station, railroad, month, day and year."

The above has reference to revised AAR publication "Rules for Inspection, Testing and Maintenance of Air Brake Equipment on Locomotives and Cars." Rule 101 (a) provides that, when a freight car having brake equipment not due for periodic attention as indicated by standard stenciling is on shop or repair tracks, the brake equipment must be tested by the single car testing device providing that car has not been tested within the previous 90 days as indicated by stenciling. The same type and size of markings shown on page 147 of the 1957 Code of Interchange Rules can be used, always utilizing the clear space on the opposite side or end of reservoir. If cleaning marks are on end of reservoir, the I.D.S.C.T. marks should be placed on the side, or vice-versa. An example of the new markings would be as follows:

I.D.S.C.T.
DET 12-27-51
NYC

The AAR advises there will be a few cases where it will be necessary to follow in general the provisions of par. (f) of Interchange Rule No. 60.

Owen Clarke Resigns

Owen Clarke, chairman of the Interstate Commerce Commission, has resigned to become vice-president of the Chesapeake & Ohio in Cleveland.

Orders and Inquiries for New Equipment

Placed Since the Closing of the January Issue

Diesel-Electric Locomotive Orders

Road and builder	No. of units	Horsepower	Service	Other detail
PENNSYLVANIA:				
Alco Products	44	1,800	—	19 delivered. Remaining 25 for delivery by April.
	6	1,000	—	For delivery by March.
Electro-Motive	140	1,750	—	Delivered.
	35	1,200	—	For delivery by May. All 225 units ordered under lease.

Freight-Car Orders

Road and Builder	No. of cars	Type of car	Cap. tons	Length, ft.	Other detail
CANADIAN NATIONAL:					
Eastern Car Div., Dominion Steel & Coal Corp.	700	Triple hopper	—	—	Deliveries of these 1,850 cars to begin early this year.
National Steel Car	250	Triple hopper	—	—	
	200	Refrigerator	50	—	———
Canadian Car	200	Triple hopper	—	—	———
	200	Gondola	70	—	
Marine Industries	300	Flat	50	—	
CHICAGO, ROCK ISLAND & PACIFIC:					
American Car & Fdry.	10	Covered hopper	70	—	Unit cost, $10,725. For delivery this month.
LOUISVILLE & NASHVILLE:					
Pullman-Standard	1,100	Gondola	—	45	Deliveries of these 2,000 cars to be completed this year.
	500	Gondola	—	52	
American Car & Fdry.	200	Gondola	—	40	
	100	Covered hopper	70	—	
Greenville Steel Car	100	Gondola	—	65	
NORTH AMERICAN CAR:					
Bethlehem Steel	40	Mill type gondola	70	—	———
Pullman-Standard	2	Covered hopper	70	—	———
TEXAS & PACIFIC:					
Company shops	75	Insulated box	—	50½	Delivery of 200 cars to be completed by June.
	100	Flat	—	53½	
UNION PACIFIC:					
American Car & Fdry.	200	Gondola	70	—	———
Bethlehem Steel	200	Gondola	70	—	———
Pullman-Standard	200	Box	50	—	———

Personal Mention

Bangor & Aroostook.—*Oakfield, Me.:* DAVID G. MERRILL appointed division master mechanic. Formerly assistant engineer, Derby, Me.

Boston & Maine.—*Boston Engine Terminal:* WALLACE H. CHAPLIN appointed general foreman, succeeding O. O. LEWIS, retired. Position of general diesel foreman abolished.

Chesapeake & Ohio.—*Walbridge, Ohio:* E. J. HENSHAW appointed general car foreman,

(*Continued on page 16*)

Personal Mention

(*Continued from page 14*)

succeeding S. B. THORNTON, deceased. *Grand Rapids, Mich.:* D. C. DELEEUW appointed general foreman, succeeding H C. WOODWORTH, retired.

Delaware, Lackawanna & Western. — *Scranton, Pa.:* F. T. JAMES appointed assistant to vice-president—operations, and L. B. COLEMAN, assistant general manager. Positions of general superintendent of motive power and equipment and general superintendent of operations abolished.

M. B. Crowley, GN

R. C. Johnston, PRR

T. W. Bellhouse, StL&W

Great Northern.—*St. Paul, Minn.:* MILES B. CROWLEY appointed superintendent of motive power. *Career:* Started with the GN at Everett, Wash., in 1926 as an enginehouse laborer. Subsequently became electrician; assistant superintendent of electrical operations; traveling engineer; diesel supervisor and master mechanic at Seattle in January 1957.

Selected I.C.C. Motive Power and Car Statistics

• Freight Service

M211 Item No.		Month of October		10 months ended with October	
		1957	1956	1957	1956
3	Road locomotive miles (000):				
3—06	Total, Diesel-electric	37,742	38,848	368,294	371,673
3—07	Total, electric	699	752	6,943	7,300
3—04	Total, locomotive-miles	40,334	44,035	396,237	420,964
4	Car-miles (000,000):				
4—03	Loaded, total	1.661	1.816	16.167	16.929
4—06	Empty, total	998	979	9,598	9,377
6	Gross ton-miles-cars, contents and cabooses (000,000):				
6—03	Total in Diesel-electric locomotive trains	113,007	114,669	1,089,332	1,074,345
6—04	Total in electric locomotive trains	2,228	2,417	22,000	22,734
6—06	Total in all trains	122,072	130,310	1,186,296	1,216,838
10	Averages per train-mile (excluding light trains):				
10—01	Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10—02	Loaded freight car-miles	43.9	44.2	43.4	43.2
10—03	Empty freight car-miles	26.4	23.9	25.7	23.9
10—04	Total freight car-miles (excluding caboose)	70.3	68.1	69.1	67.1
10—05	Gross ton-miles (excluding locomotive and tender)	3,227	3,174	3,118	3,103
10—06	Net ton-miles	1,471	1,479	1,449	1,424
12	Net ton-miles per loaded car-mile	33.5	33.4	33.4	33.0
13	Car-mile ratios:				
13—03	Per cent loaded of total freight car-miles	62.5	65.0	62.7	64.4
14	Averages per train hour:				
14—01	Train miles	18.5	18.2	18.8	18.5
14—02	Gross ton-miles (excluding locomotive and tender)	59,240	57,218	59,048	56,907
M240 Item No.					
14	Miles per diesel-electric unit day:				
14—01	Road freight units	209.5	—	209.2	—
14—02	Road passenger units	425.8	—	440.4	—
17	Car-miles per freight-car day:				
17—01	Serviceable freight cars	46.7	48.8	46.1	46.8
17—02	All freight cars	44.6	47.0	44.1	45.0
18	Average net ton-miles per freight-car day	933	1,021	926	956
19	Per cent of home cars of total freight cars on line	110.1	112.3	110.6	112.0

• Passenger Service

M213 Item No.					
3	Road motive-power miles (000):				
3—06	Diesel-electric	19,209	20,062	194,766	202,828
3—07	Electric	1,083	1,212	11,432	12,458
3—04	Total	20,542	21,822	209,231	222,696
4	Passenger-train car-miles (000):				
4—08	Total in all locomotive-propelled trains	206,382	224,405	2,145,386	2,305,585
4—11	Total in Diesel-electric locomotive trains	191,518	205,462	1,984,706	2,096,407
12	Total car-miles per train-mile (average):	9.50	9.80	9.74	9.91

• Yard Service

M215 Item No.					
1	Freight yard switching locomotive-hours:				
1—03	Diesel-electric[1]	3,858,207	4,026,981	37,835,697	38,025,526
1—06	Total	4,003,156	4,301,936	39,425,228	40,699,047
2	Passenger yard switching hours:				
2—03	Diesel-electric[1]	240,556	249,896	2,403,445	2,473,188
2—06	Total	267,774	282,662	2,682,110	2,810,200
3	Hours per yard locomotive-day:				
3—02	Diesel-electric	15.2	16.2	15.3	15.7
3—05	Serviceable	15.5	16.2	15.5	15.7
3—06	All locomotives (serviceable, unserviceable and stored)	14.3	15.1	14.3	14.3
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.68	1.65	1.69	1.67
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.80	0.78	0.77	0.75

1 Excludes B and trailing A units.

New York Central.—*Beech Grove, Ind.:* CARROLD STEVENSON appointed superintendent shop—car; F. E. BRITTON, general foreman, passenger department, and R. T. TOMLINSON, assistant general foreman, passenger department. *Buffalo:* F. H. MCHENRY appointed master mechanic, Buffalo division. Formerly superintendent diesel terminal, Collinwood, Ohio.

Pennsylvania.—*Buffalo:* RICHARD C. JOHNSTON appointed superintendent of equipment, Northern region. *Sunnyside Yard, Long Island City, N. Y.:* HAROLD L. WOOD appointed master mechanic, succeeding Mr. Johnson. *Chicago:* W. H. MILLER appointed master mechanic, Northwestern Region, succeeding Mr. Wood.

St. Louis Southwestern.—*Pine Bluff, Ark.:* T. W. BELLHOUSE appointed to newly created position of assistant superintendent motive power. *Career:* Began in mechanical department of Cotton Belt in 1934, serving successively as a special apprentice, mechanical inspector, general locomotive foreman, and master mechanic, southern division, Tyler, Tex.

Western Maryland.—*Hagerstown, Md.:* GEORGE M. BEISCHER appointed assistant superintendent motive power. Formerly assistant mechanical superintendent, Warren district, New York Central, at Cleveland.

Obituary

Lewis D. Freeman, until recently trustee of the New York, Ontario & Western, died in Middletown, N. Y., on January 11. Prior to his service with the O&W, Mr. Freeman was examiner for the Railroad Division, Reconstruction Finance Corporation.

C. E. Barrett, superintendent car department, Chicago, Milwaukee, St. Paul & Pacific, died in the Milwaukee County Emergency Hospital, Milwaukee, on January 5.

Supply Trade Notes

PULLMAN-STANDARD CAR MANUFACTURING COMPANY. — *Robert F. Bogan* has been appointed manager in charge of special railroad projects for the sales department. *Lewis H. Warheit* has been appointed manager of works of the Butler, Pa., freight-car plant, succeeding *H. S. Hogan,* retired.

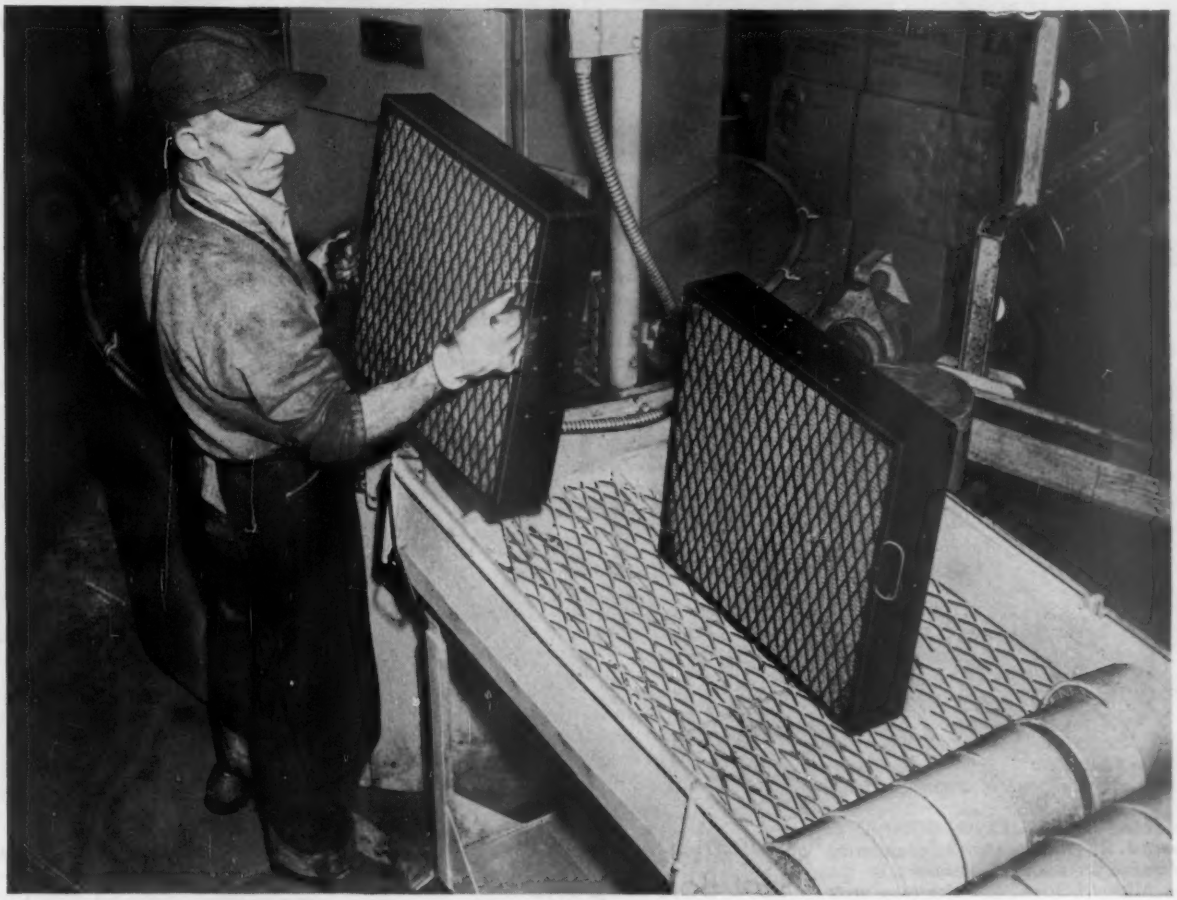
(*Continued on page 18*)

ENGINEER'S FIELD REPORT

PRODUCT CHEVRON FILTER COAT

FIRM FARR COMPANY
Los Angeles, Calif.

Air filter firm uses Chevron coating exclusively

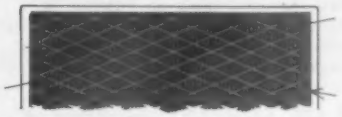


Farr Co. supplies impingement-type air filters, oiled with Chevron Filter Coat, to nearly all major railroads. A leader in air filtering, Farr has used Chevron Filter Coat (formerly Calol) exclusively for three years, since product was introduced.

Farr's Director of Research, S.F. Duncan, recommends gel-structure oils like Chevron Filter Coat because they improve filter efficiency. Other users report Chevron Filter Coat increases filtering efficiency as much as 50% over oils they previously used.

A heated centrifugal oiler of their own design (above) applies Chevron Filter Coat to all Far-Air filters just before they are packed for shipment. Filters are immersed in heated oil for 30 seconds, then raised and spun at 300 rpm for a minute to remove excess oil.

Why Chevron Filter Coat ups efficiency of air filters



- High wicking ability—quickly soaks dust particles
- Will not drip off screens—gives full filtering efficiency through entire service period
- Easily applied and cleaned—but will not wash off in service
- Does not separate, harden, or change properties in service
- Non-corrosive to metals

CHEVRON Industrial Lubricants

For More Information about this or other petroleum products, or the name of your nearest distributor, write or call any of the companies listed below.

TRADEMARK "CHEVRON" AND "CHEVRON" DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Supply Trade Notes

(*Continued from page 16*)

OAKITE PRODUCTS, INC. — *Walter G. Sittmann,* has been transferred to 315 Alexander st., Rochester, N.Y., to head the new Upper New York State Division, comprising the technical field representatives and warehousing facilities based in Albany, Utica, Syracuse, Binghamton, Elmira, Rochester, Buffalo, and Scranton, Pa. *John P. Melhado,* a field representative in New York, succeeds Mr. Sittmann as Pittsburgh division manager. *Victor L. Baltzell,* representative in Dallas, has been appointed manager of the new Mid South Division at Fourth and Broadway, Louisville, Ky. This division consists of representatives in Cincinnati, Nashville, Little Rock, Knoxville, Louisville, Evansville, Jackson, Shreveport, Memphis, and New Orleans.

■

AMERICAN AIR FILTER COMPANY. — *Frank K. Platt,* has been appointed to the newly created position of central regional manager, with headquarters in Detroit. Mr. Platt was previously president of the Air Engineering Company.

■

EX-CELL-O CORPORATION. — *Robert W. Ford* has been appointed sales manager, Machine Tool Division; *Herbert A. Knack,* sales manager, Continental Tool Works Division, and *Ruddy M. LaPierre,* manager, Bushing sales.

■

ADAMS & WESTLAKE COMPANY. — *R.F. Herrold* has been appointed eastern sales manager, Transportation Division, succeeding *F.C. Rauch,* retired.

■

UNITED STATES STEEL CORPORATION, U.S. STEEL SUPPLY DIVISION. — *Lloyd C. Fitzgerald,* assistant manager of sales, appointed manager of sales, Chicago district, succeeding *Donnell W. Newman,* resigned.

■

T-Z RAILWAY EQUIPMENT COMPANY. — *Richard R. Jenkins* and *James G. Eliasek* appointed representatives in southeast states.

■

HUCK MANUFACTURING COMPANY. — *Russell J. Roe* has been named engineering representative for users of fasteners in the Kansas, Missouri, Iowa, and Nebraska area.

■

JOHN A. ROEBLING'S SONS CORPORATION. — *E. George Hartmann* has been elected vice-president, sales, at Trenton, N.J., succeeding *Ernest C. Low,* retired. *F.T. Updike,* chief engineer, has been appointed sales manager.

■

BROOKS OIL COMPANY. — *Alfred A. Paul* has been appointed general manager of engineering-sales at Cleveland. Sales and engineering offices have been moved from Pittsburgh, to the executive offices and plant at 3304 E. 87th street, Cleveland. The Pittsburgh office continues as a district sales office.

■

KELITE CORPORATION. — *Kenneth C. Edson* has been appointed Los Angeles district sales manager.

■

SPEER CARBON COMPANY. — *Arthur L. Olender* has been appointed a development engineer, Speer Carbon Division. Mr. Olender was previously a development engineer with the Union Carbide Corporation.

A. S. Chalfant

F. B. Steele

R. A. Bollman

S. O. Dunn

BUFFALO BRAKE BEAM COMPANY. — *Robert A. Bollman,* eastern railway sales representative, has been appointed sales manager.

■

A.M. BYERS COMPANY. — *A.S. Chalfant,* director of steel sales, has been appointed general manager of sales. *R.I. Enzian* is manager of wrought-iron sales; *F.E. Farnan,* manager sales promotion, and *R.J. Bricmont,* manager engineering service. *Harry R. Rowland,* former vice-president, is now a consultant on wrought-iron sales. *Jed J. Merrill* has been appointed Philadelphia division manager, succeeding *E.L. MacWhorter,* retired, and *Harry E. Thompson* succeeds Mr. Merrill as New England division manager at Boston.

■

WHEELABRATOR CORPORATION. — *James F. Connaughton,* executive vice-president, has been elected president, succeeding *Otto A. Pfaff,* retired.

■

GOULD-NATIONAL BATTERIES, INC.— *F.B. Steele* has been appointed district manager at 100 East Ohio street, Chicago.

■

SPARTON CORPORATION. — The entire operation of Sparton Tri-Belt Freight Car Loading System has been transferred from Jackson, Mich., to Sparton Corporation, Allied Steel and Conveyors Division, 17333 Healy avenue, Detroit, Mich. *Warren E. McKittrick,* vice-president of Sparton and divisional general manager of the Allied Steel and Conveyors Division, has been appointed manager of Tri-Belt activities. *W. R. Murphy,* assistant to the president of Sparton, will assist Mr. McKittrick in the sales of the Tri-Belt loading system. *W. Bradley Gilkey* and *David D. Wood,* assistants to vice-president, will head up the sales force.

■

ARCHER - DANIELS - MIDLAND COMPANY. — *Howard M. Lillejord* has become a sales representative for ADM Freight Liner Products at Minneapolis.

■

Obituary

FRANK J. SWANSON, 67, sales and service engineer for the Holland Company, died December 21 in Wesley Memorial Hospital, Chicago.

■

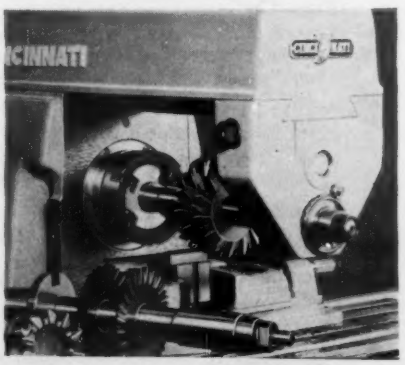
SAMUEL O. DUNN, chairman emeritus of the Simmons-Boardman Publishing Corporation and editor emeritus of *Railway Age,* died January 4 in Grant Hospital, Chicago. Mr. Dunn was chairman of the board and chief executive officer from 1931 to 1950. Since then he had been chairman emeritus.

Summary of Monthly Hot Box Reports

Month	Cars set off between terminals with hot boxes: System	Foreign	Miles per car set off
October 1953	3,863	6,493	293,796
October 1954	5,182	6,985	234,472
1955			
October	3,966	7,182	271,364
November	2,010	3,972	493,184
December	1,819	3,774	522,444
1956			
January	2,029	4,302	462,029
February	2,570	5,611	341,542
March	2,517	6,212	346,853
April	3,202	6,881	290,626
May	4,672	10,903	196,688
June	6,777	15,125	135,774
July	8,484	16,067	113,573
August	9,891	16,892	113,474
September	6,834	12,629	149,970
October	4,357	8,429	243,505
November	2,650	5,560	359,759
December	2,256	4,436	438,425
1957			
January	3,373	6,121	291,453
February	3,272	6,844	264,538
March	3,164	6,687	307,306
April	3,949	8,447	228,493
May	6,580	12,691	154,387
June	8,285	16,277	115,749
July	10,438	18,819	96,064
August	9,662	17,639	109,839
September	6,736	12,066	147,694
October	4,616	8,050	233,004

What's New

(*Continued from page 6*)

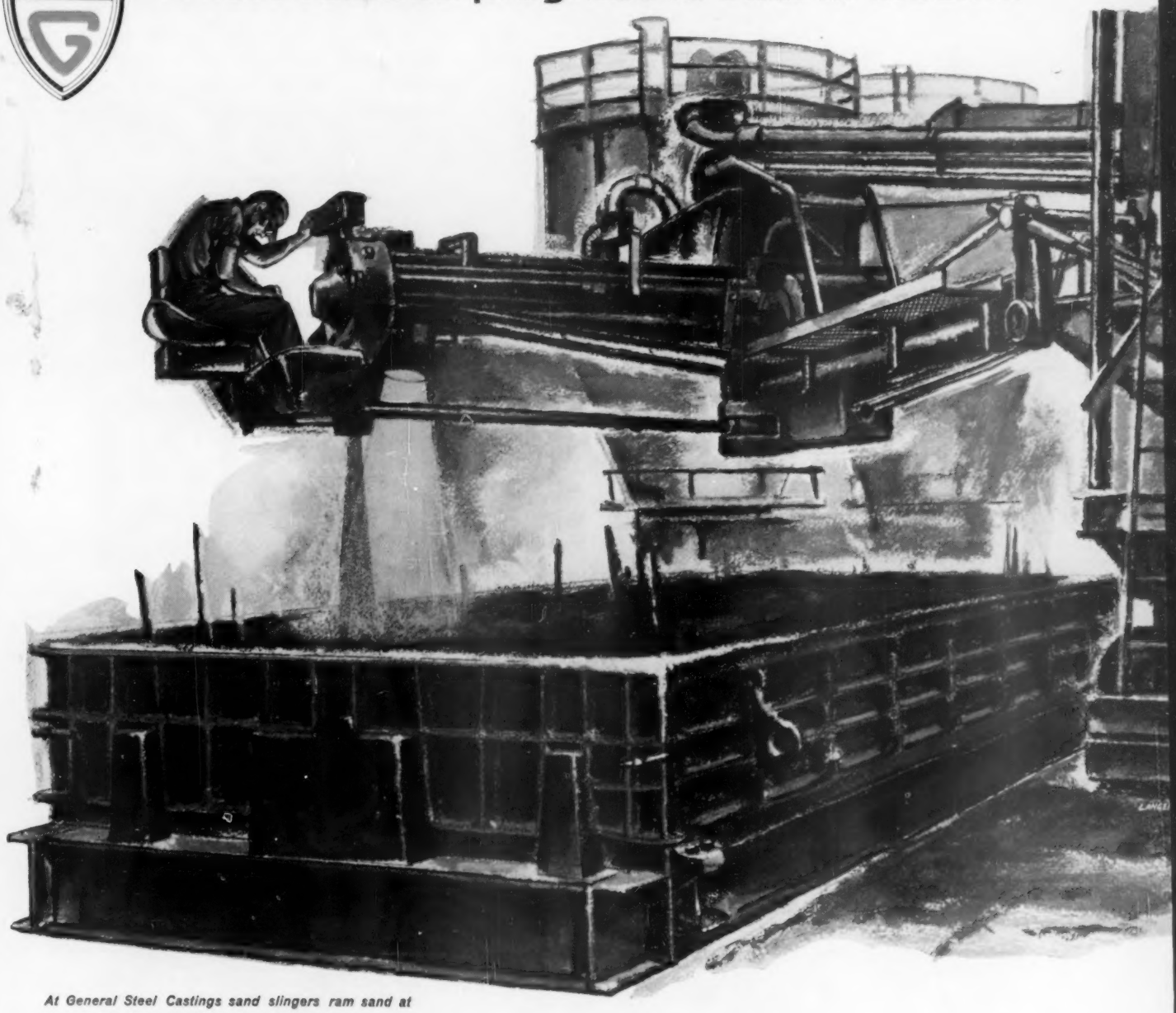


Spindle Nose

The spindle nose now incorporated in 28 sizes and styles of Cincinnati knee-and-column milling machines is known as Arbor-Loc and provides a quick and easy method of changing arbors. Dimensions and basic design of the

(*Continued on page 62*)

Where railroad progress is cast in steel....



At General Steel Castings sand slingers ram sand at the rate of a ton per minute. Skilled operators and massive machines make short work of ramming huge and complex molds.

Modern railroads run on ideas . . . and one of the biggest is the General Steel concept of combining many separate parts into a large one-piece casting. This forward step has resulted in great progress for railroads and other industries throughout the world.

Users of castings from General Steel are assured of decreased maintenance costs, improved operation, greater safety and maximum availability of equipment.

Bulkhead flat car equipped with one-piece cast steel underframe and interlocking cast steel ends.

- *longer life with greater availability*
- *safer shipping for heavier loads*
- *maintenance free cast steel underframe*

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

Another Advance . . .

new Holland **Ride Stabilizer RS-2**

upgrades existing freight car trucks to HIGH SPEED SERVICE **AT A SAVING OF OVER 80% of NEW TRUCK COSTS**

New

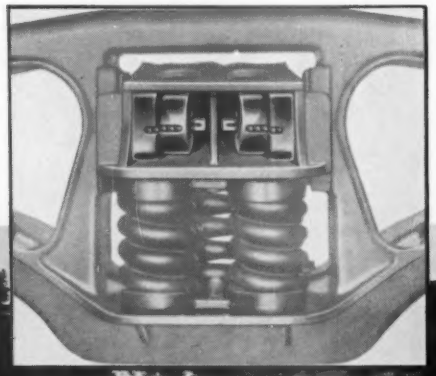
- Center Retention Means for simplified assembling and dismantling
- Larger control spring for full face pressure—longer life

An Eastern Railroad is now upgrading 2800 of their old trucks with new Holland RS-2 units for service under 1400 rebuilt freight car bodies. Enjoy the benefits of **reduced damage claims, longer equipment life** and **longer service from roadbeds.** Takes the jolt and jar out of that old freight car . . . Stabilizes the ride laterally, vertically and longitudinally just like the new modern trucks . . . The Holland Style RS-2 can be applied to all freight car truck bolsters of A. A. R. approved design.

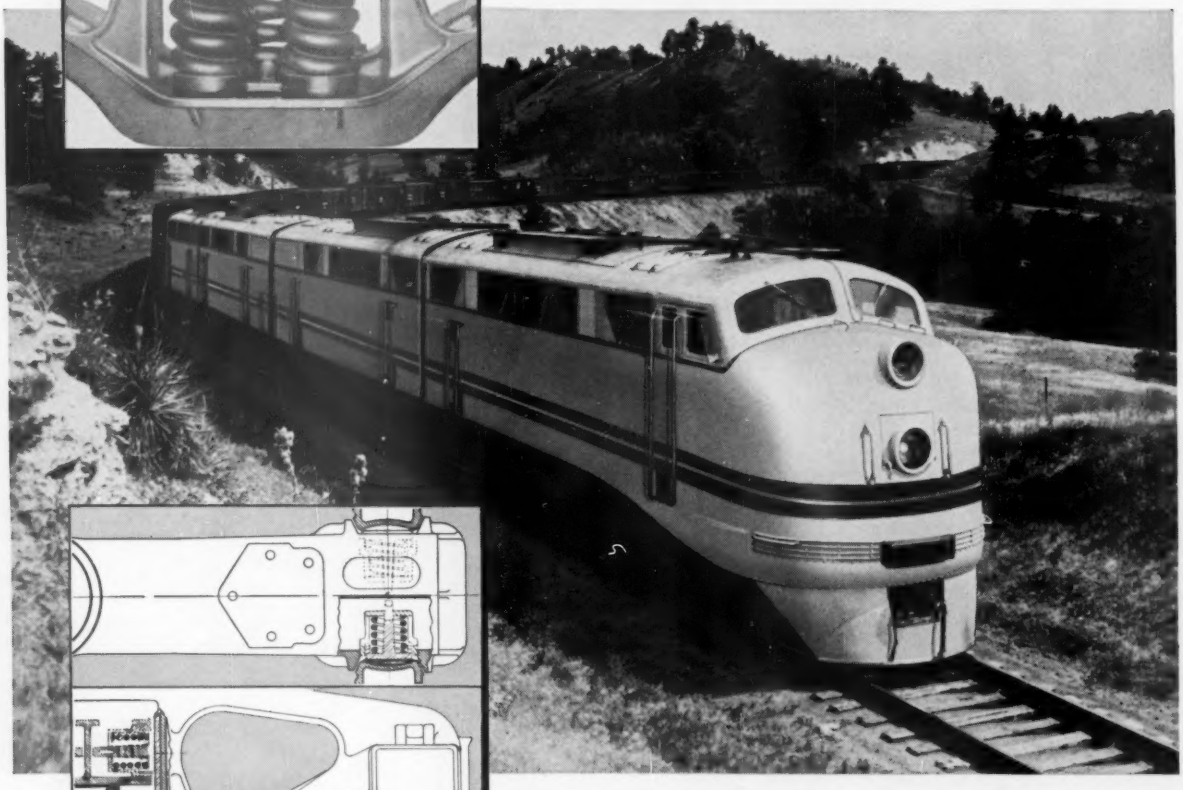
Write for our new Tell-All Bulletin RS-2 and for complete information . . . Ask about our on-the-job engineering service.

HOLLAND COMPANY

332 S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS



The Holland Ride Stabilizer actually becomes an integral part of the bolster and ride control not just a temporary measure . . . Installation is simplified and direct Engineering assistance from Holland is available.



Cutaway top view shows new large control spring

Cutaway side view shows new Center Retention Means

298

It's the new...

Pelican NUT ACCUMULATOR

With the SIOUX Pelican Nut Accumulator attached to an impact wrench, ten nuts can be spun off and back on again without being touched by human hand. It will hold ten ¾" or 13/16" hex nuts either 7/16" or ½" thread.

The center stem with its load of nuts is easily removed and another empty stem installed in its place. With one extra stem, 20 nuts can be removed and replaced; with two extra stems, 30 nuts, etc.

The Pelican may be used with any ½" or ⅝" square drive, air or electric impact wrench. The simple, dependable mechanism has few moving parts. It cannot be damaged by overloading. It drives without loss. Nuts can't get dirty.

The SIOUX Pelican costs little in relation to the time it saves. It quickly pays for itself. It's brand new and exclusively from SIOUX to you.

LOADED CENTER STEM

LOOK UNDER TOOLS ELECTRIC!

ALBERTSON & COMPANY, Inc.

SIOUX CITY, IOWA, U. S. A.

• NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • ELECTRIC IMPACT WRENCHES • DRILLS
• SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS
• FLEXIBLE SHAFTS • ABRASIVE DISCS

✓ *Here's* **STANDARD'S** *responsibility to the railroads at work...*

Now! Cut down costly end lining repairs with new

LINE-RITE, new low maintenance End Lining, is another development that reflects Standard's "responsibility to the railroads" ....the creation of new products to make your operation more efficient, more profitable.

LINE-RITE is assembled metal and wood lining that greatly reduces maintenance costs—even cuts down the *need* for maintenance through added strength. Infestation hazards are reduced also. The end result is more cars available for high-class lading.

Maintenance costs slashed—the dovetailed metal socket running from the end lining retainer to the floor of the car provides solid backing for the entire length of the board . . . locks each board positively and securely in place. New LINE-RITE *virtually eliminates* the costly operation of replacing broken and missing end lining boards.

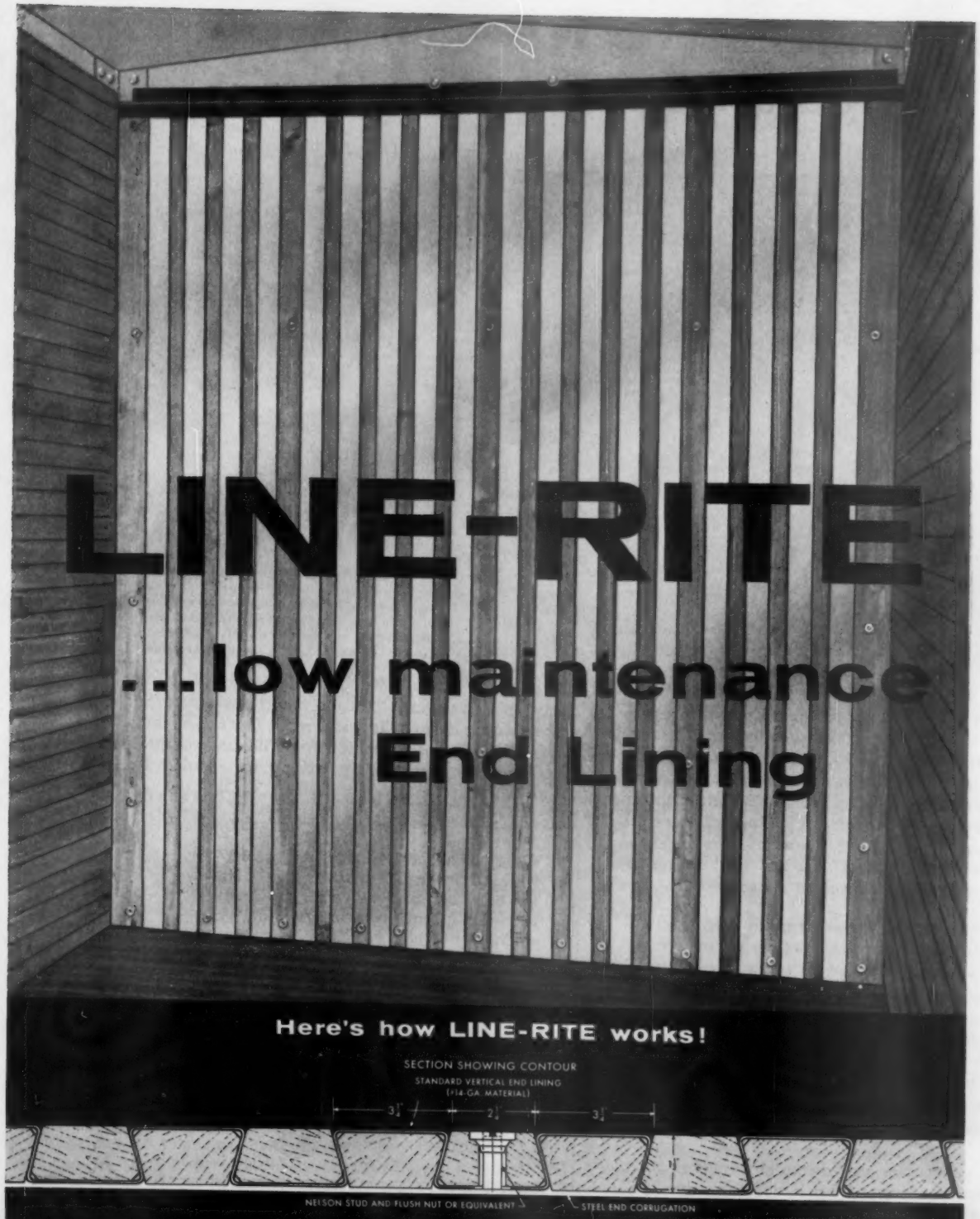
Added strength through distribution of impact—the assembled metal and wood lining gives additional strength to the end of the car by distributing impacts over a larger area and allows the corrugations in the outer steel end to exert resistance to impact as a unit... not only are maintenance costs slashed but the *need* for maintenance is greatly reduced.

Infestation hazard reduced—the continuous steel member, after proper application, provides a positive wall which effectively blocks the infiltration of flour and grain into the space behind the lining.

More high class lading cars—you'll have many more cars available for profitable high class lading because LINE-RITE will reduce the number of cars out of service . . . you'll have less maintenance at lower cost *and* damage to lading will be minimized.

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY

General Office: 4527 Columbia Ave., Hammond, Ind. • New York • Chicago • St. Paul • San Francisco



Here's how LINE-RITE works!

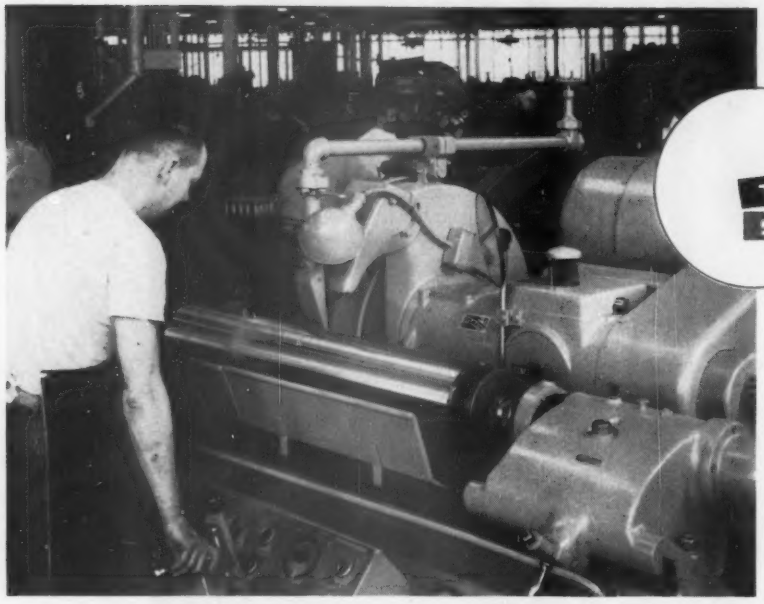
SECTION SHOWING CONTOUR
STANDARD VERTICAL END LINING
(#14-GA. MATERIAL)

•The interior surface of each end of the car is covered by four metal panels formed to provide alternate dovetailed sockets for retention of the end lining boards. Each metal panel, covering approximately one-fourth of the end area, is held in place with welded studs and a new flush type round nut. This fastening method allows easy removal of the lining in quarter sections for repairs or replacement of boards. No furring strips need be used and cheaper grades of lumber have proved adequate as inserts in the dovetailed sockets. The wooden inserts provide an adequate nailing area and greatly reduce condensation problems.

LINE-RITE has been tested and proved in over 2500 cars. Ask your Standard representative for details.

Cincinnati Filmatic 16" Plain Grinders

Quickly give your large cylindrical work...



THE HIGHEST QUALITY SURFACE FINISH

FILMATIC

Flame hardened radial drill columns, requiring an extra high quality surface finish and precise accuracy, are ground on this CINCINNATI FILMATIC 16" x 72" Plain Grinding Machine.

Rapid stock removal of metal is fine for production. But it often works a hardship on surface finish, especially for precision cylindrical grinding operations. CINCINNATI FILMATIC 16" Plain Grinders have changed this relationship . . . these machines grind away excess stock at an amazing rate, and then with no extra attention whatever they finish to final size and produce an extra high quality surface. The 16" machine and its companion 14" size are well equipped to grind heavy precision work at the lowest cost.

FILMATIC grinding wheel spindle bearings will last the life of the machine; they automatically adjust for load (rapid stock removal of metal).

Automatic grinding wheel balancing. Formerly a time-consuming chore; perfect balance now accomplished in a few seconds while the machine is running.

Finger-tip selection of table traverse rates; infinitely variable, electronically controlled.

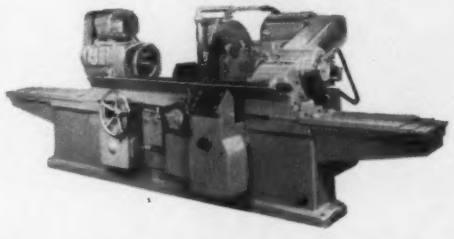
Automatic lubrication of ways and principal units.

Ample power for rapid metal removal . . . 20 hp spindle drive; 2 hp headstock drive (16" machine).

CINCINNATI

CINCINNATI FILMATIC 14" and 16" Plain Grinders offer many additional advantages for shops concerned with grinding large cylindrical work. Get all the facts. Brief data in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. G-607-1.

CINCINNATI FILMATIC 16" x 48" Plain Grinding Machine. Brief data for both 14" and 16" sizes tabulated below. Get complete information by writing for catalog No. G-607-1.

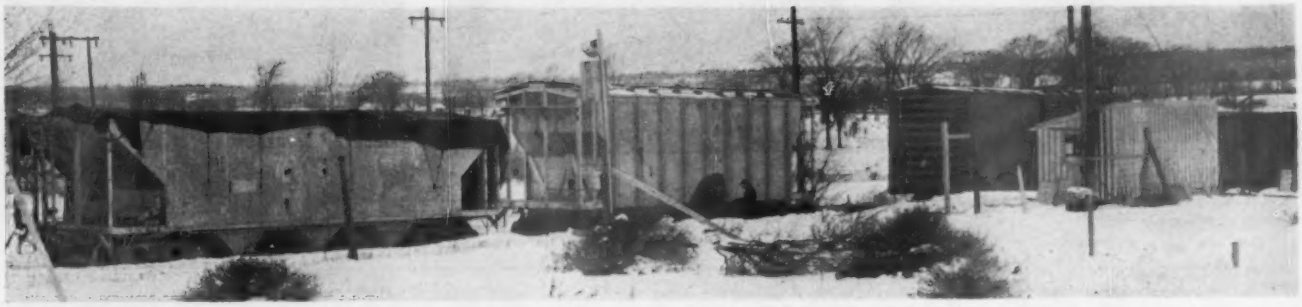


Size	Spindle Drive	Headstock Drive	Lengths between centers
14"	20 hp	1½ hp	36, 48, 72, 96, 120, 144, 168"
16"	20 hp	2 hp	36, 48, 72, 96, 120, 144, 168"

CINCINNATI®

CENTERTYPE GRINDING MACHINES • MICRO-CENTRIC GRINDING MACHINES
CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES • CHUCKING GRINDERS • CENTERLESS LAPPING MACHINES

CINCINNATI GRINDERS INCORPORATED • CINCINNATI 9, OHIO



At the Laboratory . . .

. . . and in Regular Service

Aluminum Center Sills Prove Themselves

After 75 impact tests, the laboratory of the Aluminum Company of Canada reports that the company's extruded aluminum center sill has successfully withstood impact forces up to 947,000 lb. "It is confidently expected," the report continues, "that the center sill could withstand considerably higher forces since the present tests were limited by the failure of the welded steel draft lugs and not the center sill itself."

The extruded Z section's shape is very similar to that used in the standard AAR steel center sill. Like the rolled AAR sill, the Alcan design requires that two Zee's be welded together. All of this culminates a long and thorough development program.

In early applications aluminum was merely substituted for steel. As experience proved that aluminum stands up well to service conditions and has excellent resistance to the weather, brine and corrosive cargoes, designs were altered to suit the characteristics of aluminum. The next step was to design and build whole structures in aluminum. Aluminum hopper cars, with aluminum center sills, have been among the first complete structural units to be built.

To prove the soundness of these designs and to gain a better knowledge of the stresses involved, it was decided to conduct static, shakeout fatigue, and impact tests. These tests, first of their kind to be carried out in Canada, were conducted by Aluminium Laboratories Limited at Kingston, Ont. They were sponsored by the Aluminum Company of Canada. Canada's two major railroads were greatly interested in the tests and gave valuable assistance.

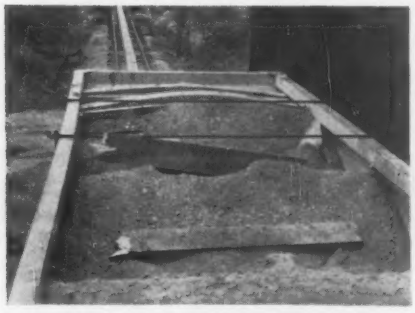
An all-welded, covered, aluminum hopper car built by Marine Industries for bauxite service in Jamaica was used for static testing. This type of car has a rated capacity of 50 tons and was fabricated from Alcan 65S-T6 (US 6061-T6) extrusions and Alcan B54S-H11 (US 5054) plate. Side sheets are ¼-in. thick, the side posts are formed from plate 5/16-in. thick, and roof sheets are ⅛-in. thick. The car has a light weight of 32,500 lb, a load limit of 136,500 lb; uses the Alcan aluminum center sill.

Strain gages were located on the top and bottom of the center sill, on the side sills, side posts, side sheets and bolsters where it was thought the major stresses would occur. The car was loaded with water and strains were recorded at sev-

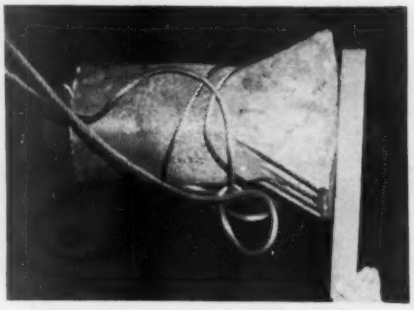
COVER PHOTO

Bauxite haul from Port Alfred, Que., to Arvida is the principal assignment for 148 aluminum hopper cars of the Roberval & Saguenay. Fewer cars, reduction in switching, and less locomotive fuel all were part of calculations justifying aluminum cars for this 26-mile run. The last 30 of these cars are the only ones having aluminum center sills. These cars were built after an extensive series of tests conducted by the Aluminum Company of Canada at its laboratoris at Kingston, Ont.

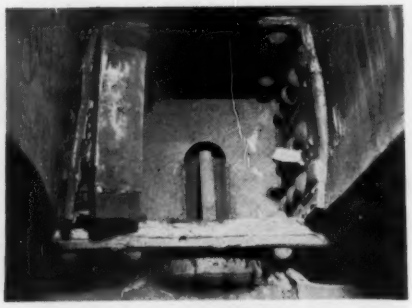
Laboratory Impact Tests Found These Things . . .



Near-million-pound impacts broke 2 x 2-in and 5 x 5-in. blocking used to compartmentize sand lading in strike car.

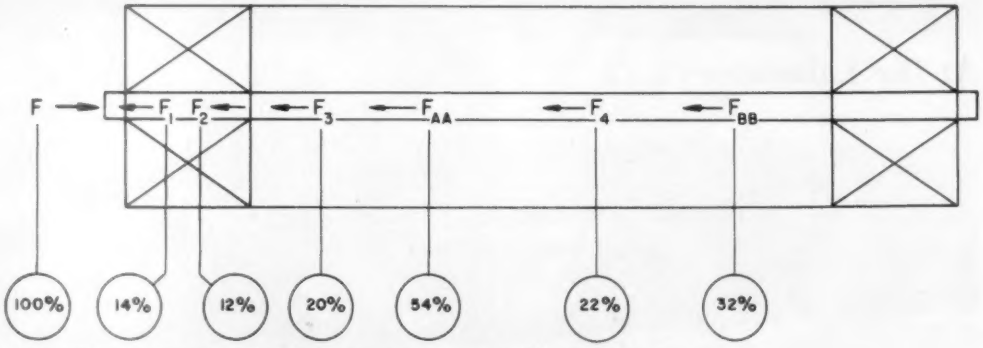


Deformation of body and end of draft gear occurred during friction gear test series. Draft lugs deformed too.

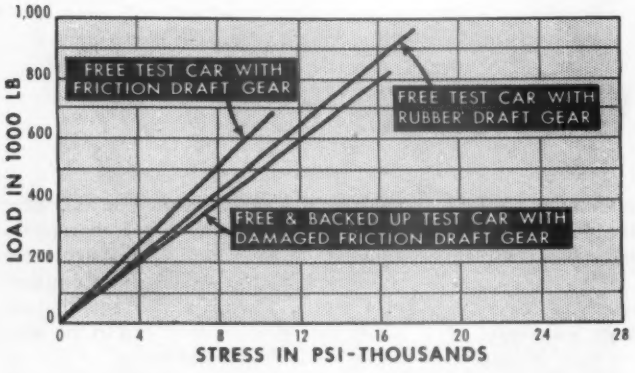


Complete failure of draft lugs occurred during rubber gear tests. Despite bulging, weld at top of sill did not fail.

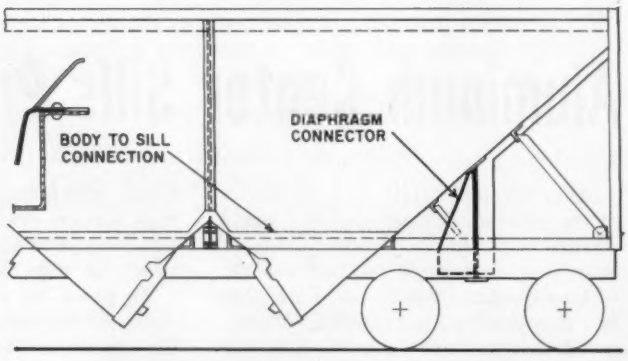
F — Impact force
F_1 — Component taken from center sill by two diagonal end sill braces in compression.
F_2 — Component taken from sill by two end sill braces in tension.
F_3 — Component taken from sill by bolster, diaphragm and truck.
F_{AA} — Component remaining as compression in sill under first hopper.
F_4 — Component taken from sill by central diaphragm.
F_{BB} — Component of impact force remaining as compression in sill under second hopper; distributed to rear of car.



Force distribution from sill to body was determined. No appreciable bulging occurred in body sheets, indicating design was adequate for the impacts involved.



Stresses developed in center sill of the test car under the first hopper showed little variation whether or not the car was backed up.



Proof that body-to-sill connections were adequate was obtained in test. These connections were designed for 1,000,000-lb impacts.

eral load increments up to the rated capacity of 100,000 lb.

Static loading of the car to its capacity of 100,000 lb produced a maximum recorded stress of 6,350 psi in the vertical post and 6,000 psi in the adjacent panel. These stresses should not be critical. They occur on the face of the post and at the center of the panel. The maximum stress observed in vertical welds was only 3,150 psi. This was a compressive stress. It should not be critical, even from a fatigue point of view. Stresses in the top and bottom chords of the sides, in the bolsters, and in the center sill were below 1,500 psi. For this loading they are relatively unimportant.

Vertical deflection at the mid-point of the center sill was 0.10 in. and that of the side walls, acting as a plate girder, was 0.04 in. The side walls were sufficiently stiff to carry all the load out to the ends of the car, rather than loading the center sill in bending. The difference in deflection between the side walls and the center sill indicates that a transverse stiffener would be desirable to reduce the bending in the center sill.

Shake-out fatigue tests were included in the test program because no fatigue data were available on open and covered hopper cars. A six-ton car shake-out was operated at full capacity for an hour on each of these empty aluminum car bodies weighing approximately five tons.

An aluminum-body, open hopper car with steel center sill was made available by the Roberval & Saguenay for shake-out fatigue tests. This car has a light weight of 36,600 lb and a rated capacity of 70 tons. The maximum alternating stress measured was about 8,000 psi and occurred both at the center of the panel immediately under the car shake-out and

at the juncture of the top member where it joined the car sides, which was also immediately under the car shake-out. A comparison of the performance of this aluminum car with that of welded steel hopper cars, tested under similar conditions, showed that aluminum performed as well, or better, than steel.

The covered aluminum hopper car used in the static test was not designed orignally for shake-out, but was adapted to receive the car shaker. From a comparison of the performance of the covered car with that of the open car, it appears that a design incorporating fewer and lighter side posts—giving larger and less rigid panels—would produce a car having excellent fatigue life under shake-out conditions.

Impact Tests

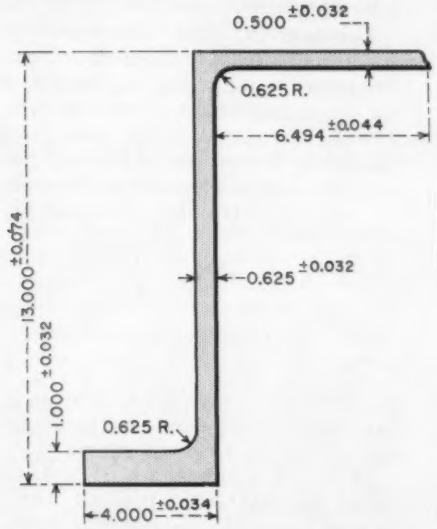
Final tests in this program were designed primarily to determine the effect of impact forces of up to a million pounds on the welded aluminum center sill. The distribution of the stresses throughout the sill and body was also studied. This was necessary to prove that the welded aluminum center sill would meet the published requirements of the AAR and would withstand severe impact loads as well as standard steel center sills.

The covered hopper car was used as the test car filled with crushed rock to give an "on the rail" weight of 168,000 lb. The R&S open hopper car was used as the strike car. It has a standard AAR type steel center sill and was loaded with sand to give an "on the rail" weight of approximately 200,000 lb.

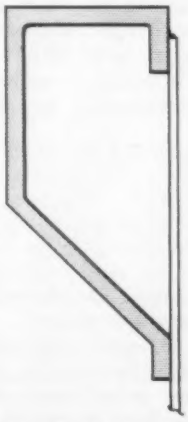
The standard Type E couplers were removed from the striking ends of the

(*Continued on page 36*)

Hoppers Are Aluminum Alloy Above the Trucks . . .



Cross sectional area of two of these sections welded into a sill is 29.77 sq in. Weight per lineal foot of assembly is 34.93 lb.



Special box-type extrusion is used for the side plate on these Roberval & Saguenay car. Relation of this section to side sheet is shown.

Aluminum Alloys Used in R&S Hopper Cars

Alcan 65S-T6 structural shapes
Heat treatable magnesium sillicide alloy
3 x 3 x ⅜-in. angle: end posts
5 x 3½ x 7/16-in. angle: corner posts, diagonal braces, end floor reinforcements, end posts, end plates, end sills, side sills.
Alcan die 31641 "T" section: side posts
Alcan die 70976 side plate: side plates
Alcan die 34073 "Z" section: center sill

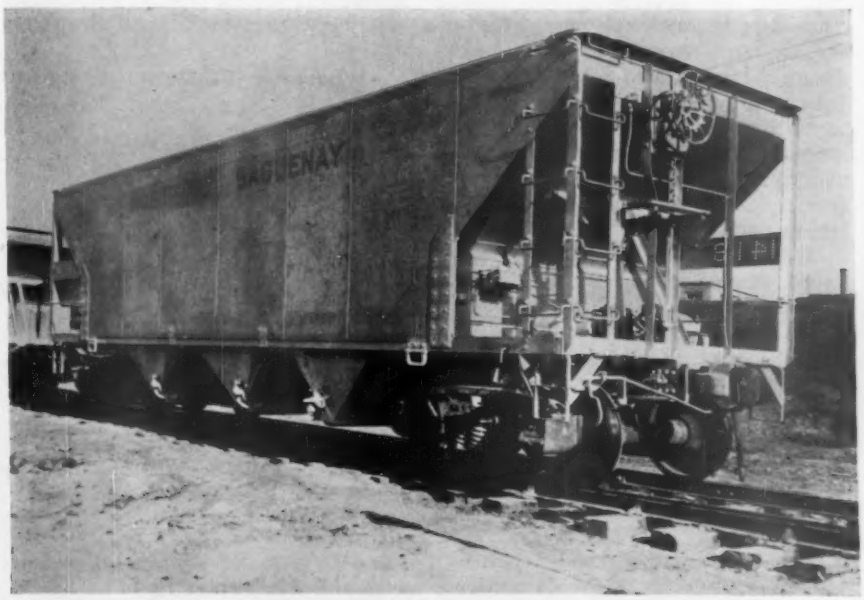
Alcan B54-H11 plates
Non-heat-treatable alloy with 4.5% magnesium
¼-in. plate: hopper doors
5/16-in. plate: bolster reinforcements, corner gussets, floor sheets, hoppers, longitudinal hoods, side sheets
⅝-in. plate: draft-gear carriers
¾-in. plate: crossbearers, bolster gussets, side braces

Alcan 26S-T6 forging
12½ x 8⅞ x 2¼-in. draft gear followers

Alcan 56S welding wire

...Conventional Specialties Are Used on These Cars

- Westinghouse ABEL air-brake equipment
- Creco No. 18 brake beams
- Schaefer brake-beam hangers
- Ajax non-spin hand brake
- Apex brake step
- Wine hopper door frames
- Wine door operating mechanisms
- Miner A22-XL draft gears
- Symington journal box lids
- Redipak journal lubricators
- Standard car truck S-2A spring-plankless trucks with Barber stabilizing feature
- Imperial rotary-release uncoupling gear



Aluminum from trucks up, car weighs 32,500 lb, is 38-ft 6-in. between pulling faces, and has a load limit of 177,500 lb. Variation between light and loaded weight necessitates Westinghouse empty-load brakes.

Highlights of ICC Annual Reports

"There was encouraging progress during the year in railroad efforts to improve service and operating efficiency." That's how the 71st Annual Report of the Interstate Commerce Commission summarized progress through fiscal 1957 which ended last June 30th.

Commission comments on advances in locomotives, cars and shops were among those covered. Among ICC legislative recommendations in this report were two of special interest to mechanical officers.

Separate reports of two sections of the ICC Bureau of Safety and Service indicate items which will receive particular attention from ICC inspectors. These are summarized separately.

When it came to railroad progress the Commission's general report took up five topics important to mechanical men.

Journals and Bearings "Railroad freight service will never be as fast and reliable as it should be until the hot box problem has been eliminated. Besides being by far the greatest basic cause of derailments (mainly due to burned off axles from past or present hot boxes), the hot box is a prime cause of delays in service. Many feel that no permanent solution is possible until there is universal adoption of roller bearings on freight cars."

Freight Cars "Several improvements in freight cars, well along toward universal adoption, include steel wheels, snubbing devices in the trucks, retainers to prevent loose waste in standard journal boxes, unit brake beams, nonspin handbrakes, strong steel alloys, and welded construction in car bodies. Steps have been taken by the AAR to make some of these changes mandatory. Other improvements, not being adopted too rapidly although considered by many to be advantageous, include cushion underframes, nailable steel floors, wider doors, brake slack adjusters, rubber draft gears, tight-lock (Type F) couplers, and load separation devices."

Shops "Some large railroads have centralized all heavy freight car repairs in a single, modern shop to reduce costs, lower the unserviceable car ratio, and raise the standard of maintenance, by concentrating work so the volume will justify the most productive machinery and permit assembly-line methods. This idea has been applied by some railroads to locomotive repairs and to wheel and axle work."

Locomotives "The conversion of American railroads to diesel-electric motive power to the virtual elimination of the steam locomotive, is now in sight. This has been one of the most rapid and costly changeovers in railroad history. A recent development in this coun-

(*Continued on page 36*)

Locomotives Are In Better Condition

Increases in travel allotments have permitted district ICC locomotive inspectors to give more attention to outlying points in their territories recently. According to John A. Hall, ICC's director of locomotive inspection, "Improved maintenance as a result of this more general coverage is reflected by an increase in the number of locomotives inspected, and a decrease both in the number of locomotives found defective and the number ordered out of service during the year ended June 30, 1957."

Locomotives inspected during that period increased 3.4 per cent over the preceding year. The number of locomotives found defective decreased 10.9 per cent; number ordered out of service for repairs decreased 19.6 per cent.

"During the year," the director continued, "the 65 inspection districts were divided into nine separate supervisory zones and a supervisory inspector appointed to each zone for the purpose of co-ordinating the work of district inspectors, training of field employees, and supervising the technical work in the field. This has resulted in improvement in the program for maintaining uniform inspection practices and enforcement procedures."

In the Forty-Sixth Annual Report by the Director of Locomotive Inspection, Mr. Hall credited "dissemination of pertinent information concerning fundamental causes of locomotive accidents and resultant casualties . . . an important adjunct to basic enforcement activities. Such public information combined with the active enforcement of the requirements has been effective in promotion of locomotive safety and has resulted in a decreasing accident trend."

Seventy-five accidents occurred in connection with all types of locomotives injuring 90 persons. Compared with the preceding year, there was a decrease of four deaths, an increase of two accidents, and an increase of eleven injured.

Of the 75 accidents which occurred during the year ended June 30, 1957, 23 were caused by the defective condition of floors, steps, and passageways of diesel-electric locomotives. Fifteen of the 23 accidents were caused by the accumulation of oil on these walking surfaces. In 10 of these 15 accidents oil

Where Are ICC Defects Being Found on Diesel and Electric Locomotives?

(Partial List of Defects)

	1957	1956	1955	1954
Air compressors	328	443	419	326
Boilers	208	275	203	175
Brake equipment	2,906	3,259	2,790	2,126
Cabs and cab windows	1,030	1,600	1,073	858
Cab floors, aprons and deck plates	1,940	1,933	1,677	1,703
Controllers, relays, circuit breakers, magnet valves, and switch groups	360	775	802	454
Coupling and uncoupling devices	116	166	204	139
Draft gear	253	360	336	291
Driving boxes, shoes, and wedges	154	291	249	154
Fuel system	2,431	2,555	1,833	1,951
Gages or fittings, air	289	278	226	136
Handholds	208	258	219	230
Internal-combustion engine defects, parts and appurtenances	5,174	6,356	5,035	4,848
Jumpers and cable connectors	442	553	214	178
Motors and generators	671	1,122	880	813
Sanders	2,023	2,307	1,492	1,200
Springs and spring rigging, driving and truck	370	363	306	241
Steps, footboards	827	1,005	737	622
Trucks	552	1,007	1,054	503
Wheels	256	252	282	257

accumulations were reported from four to forty-one times during the thirty days preceding the accidents. The number of accidents caused by the accumulation of oil on walking surfaces during the year ended June 30, 1957, decreased 25 per cent from the preceding year.

Three accidents were caused by defective condition of cab seats. Four accidents were caused by crankcase explosions which resulted in the injury of four persons. Three of these explosions resulted from the overheating of bearings, and one resulted from a defective piston. Items having a bearing on the defective condition of this piston were reported forty-four times in the thirty days prior to the accident. In 1956 there were seven crankcase explosions causing injuries.

Accidents and Resulting Casualties Caused by All Locomotive Failures

	1957	1956	1955	1954
Accidents Resulting in Casualties	75	73	83	105
Casualties: Killed and injured				
Train crew members	76	79	80	95
Maintenance employees	0	2	5	14
Other employees	2	2	18	2
Non-employees	12	0	42	194
Total	90	83	145	305
Fatalities in above total	0	4	3	3

How Frequently Do ICC Inspectors Find Defects on Diesel and Electric Locomotives?

	1957	1956	1955	1954
Number of defects	23,373	29,054	22,618	19,640
Locomotive units reported	30,740	29,405	28,100	27,135
Locomotive units inspected	93,187	88,269	85,897	83,338
Locomotive units defective	9,031	9,597	8,129	7,395
Percentage of inspected found defective	9.7	10.9	9.5	8.9
Locomotive units ordered out of service	417	492	127	140

Wider Coverage By Safety Section Inspectors

With increased travel appropriation for fiscal 1957, agents of the Section of Railroad Safety, ICC Bureau of Safety and Service, were more thoroughly able to cover their assigned territories outside of headquarters. Safety appliance agents worked 8,853 days away from headquarters during this fiscal year as compared with 5,105 days during the preceding fiscal year. As a result, inspections were made at 1,685 points which they found impossible to inspect the previous year. All this was revealed in the report of the Section of Railroad Safety to the Commission.

A total of 1,059,689 freight cars were inspected; 60,247 of these had defective safety appliances, and 71,951 defects were reported. There were 31,756 passenger-train cars inspected; 1,327 of these had defective safety appliances, and 1,567 defects were reported. A total of 13,391 locomotives were inspected; 411 of these had defective safety appliances, and 564 defects were reported. The total number of cars and locomotives inspected was 1,104,836. Inspections were conducted on 318 different railroads.

During the year, air-brake tests were made on 2,246 trains on 138 railroads prior to departure from terminals. A total of 7,051 or 6.7 per cent, of the 105,324 cars were found with defective air brakes. After these defects were called to the attention of carriers by ICC agents, 2,905 of the cars found with defective brakes were set out and the remaining 4,146 cars had their brakes repaired in the trains. As a result of ICC air brake inspections, 105,234, or 99.9 per cent of the cars departed with operative brakes.

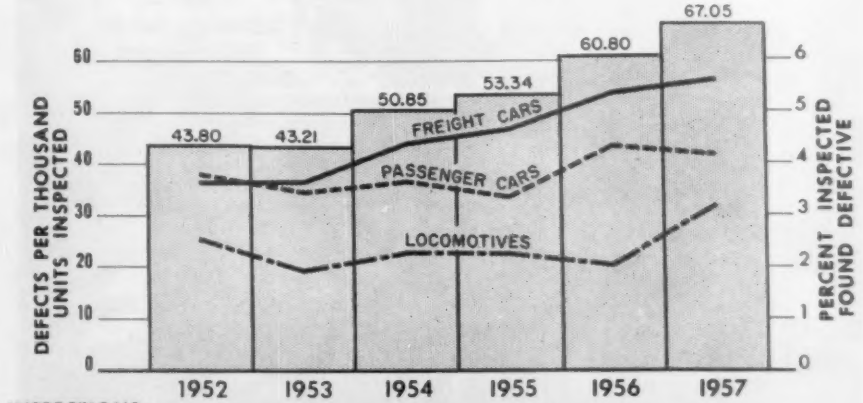
These trains had been prepared for departure, yet when afterward tested by ICC agents, it was necessary to set out cars, or repair the brakes on an average of 3.14 cars per train. A total of 4,967 cars with excessive piston travel were found. Had these trains departed prior to inspection by the Commission's agents, the percentage of operative brakes would have been only 93.3.

Air Brake Tests

Air-brake tests were made on 1,342 trains on 105 roads upon arrival at terminals. Brakes on 84,037 cars (97.8 per cent) were operative. Of those brakes considered operative, 6,956, or 8.09 per cent, were of impaired efficiency due to excessive piston travel. In the 1,342 trains tested, 1,907 cars—an average of 1.4 cars per train—were not controlled by power brakes. Among these were 250 with brakes cut out, and 1,657 with brakes not operating.

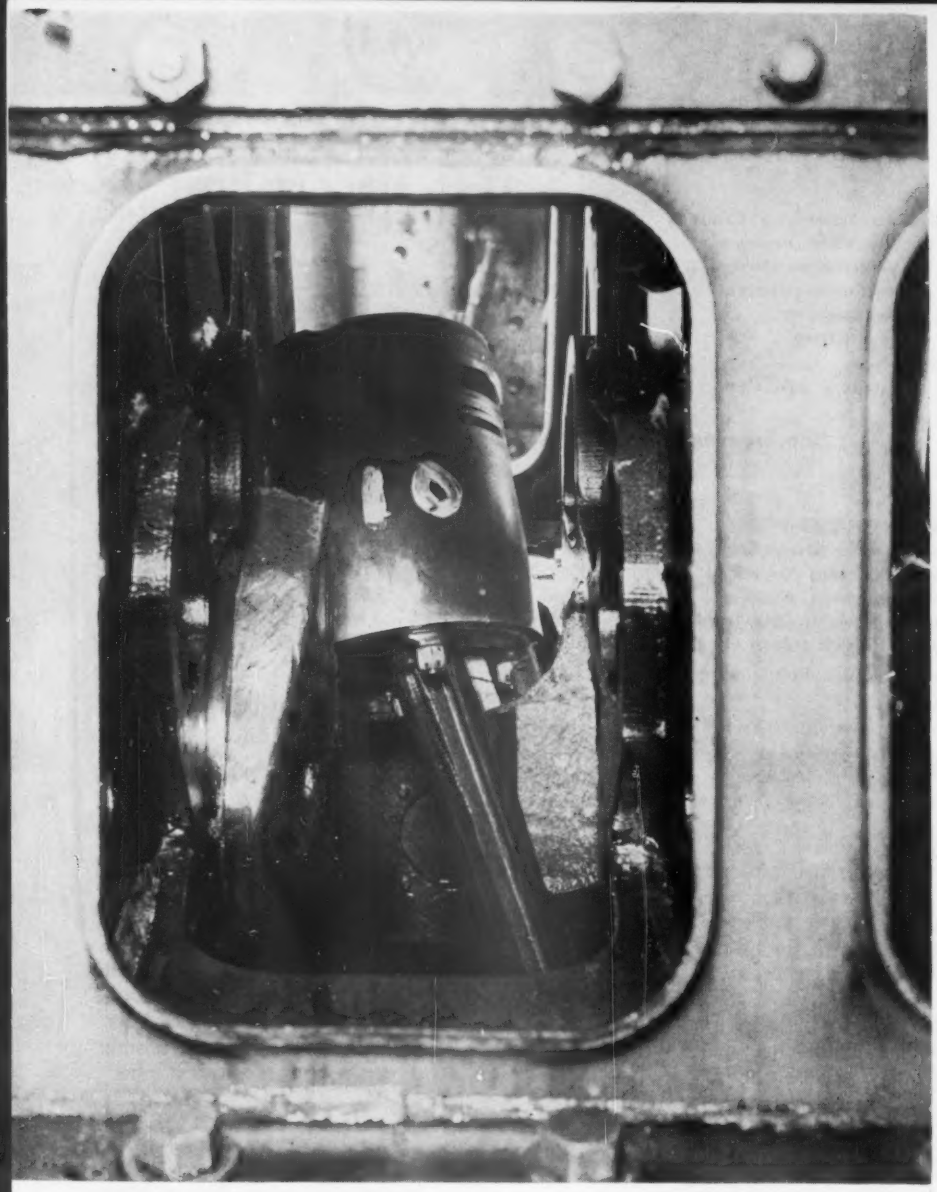
The average consist of trains tested prior to departure from terminals was 48.3 cars, an increase of 0.9 car per train as compared with the preceding year. The average consist of trains tested on arrival at terminals was 64.0 cars, an increase over last year of 2.9 cars per train.

During the year, 100 complaints were investigated, compared with 61 for the preceding year; 52 involved power brakes and 48 involved other safety appliances. In 36 of these investigations, evidence of violation of law was obtained and prosecution on 256 counts was instituted.



INSPECTIONS:

	1952	1953	1954	1955	1956	1957
FREIGHT CARS	1,185,675	1,253,590	1,347,710	1,208,586	1,157,816	1,059,689
PASSENGER CARS	29,079	38,115	42,342	41,040	39,953	31,756
LOCOMOTIVES	13,184	14,303	15,741	14,177	13,797	13,391



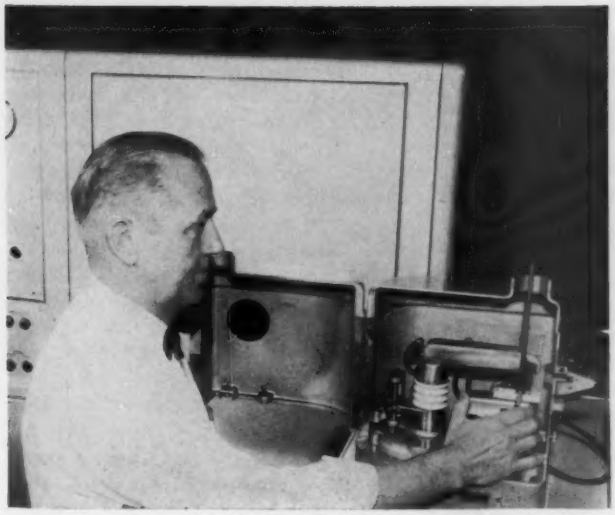
CRANKSHAFT FAILURES such as this one have been greatly reduced by Pennsy's regular spectrographic analysis of oil samples from crankcases. It detects bad bearing conditions which cause broken crankshafts.

Pennsy Checks Its Lubricating Oil

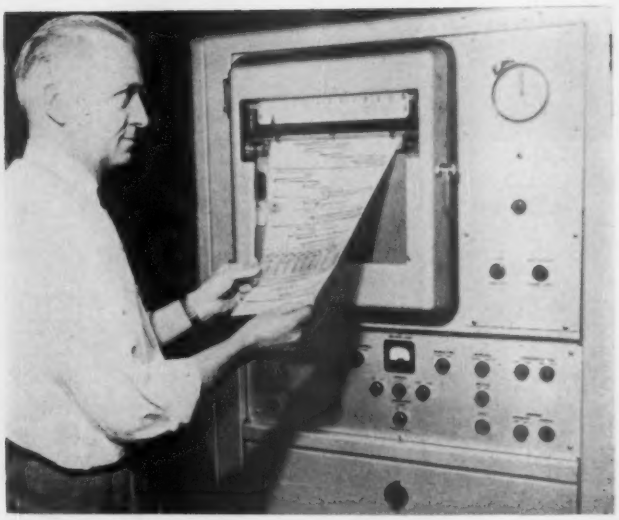
The program of spectrographic analysis operated by the test department of the Pennsylvania attempts to reduce engine failures and prolong life of parts through a reduction in their wear rates. It is only one part of an overall program which also involves additional laboratory tests other than spectrographic analysis. The samples of lubricating oil from the crankcases of Pennsy diesels are the basis for the entire operation. These samples are taken each two weeks at enginehouses to which the units are assigned. They are checked locally for indications of water or fuel dilution and are then sent to Altoona for the complete examination.

In an operating diesel engine certain wear takes place which deposits minute particles of the wearing metals in the lubricating oil. The Pennsylvania has recently installed a Quantometer in the test department laboratory at Altoona. It can detect as little as one or two parts per million of a gram of metal, and automatically records the amount found. According to M. A. Pinney, Engineer of Tests, the practice of checking Pennsy locomotive oil samples for wear metals is not new, but the Quantometer does permit a marked speed up and improvement in this detection. Samples from each road diesel locomotive are sent to the Altoona laboratories where an average of 130 samples are being tested each week day.

LABORATORY RECORDS of test results and diesel units are kept here. Technicians can tell if samples are coming in from each crankcase and if reported defects have been followed up.



ALUMINUM CHAMBER containing sample of used diesel engine lubricating oil is inserted between electrodes of Quantometer by Chemical Laboratory Foreman E. G. Wertz in Pennsylvania test labortories at Altoona, Pa., to check rate of locomotive engine wear indicated by small quantities of metal in the oil.



GRAPHIC RECORD automatically prepared by this electronic device shows rate of locomotive engine wear indicated by small quantities of metal it detects and counts in used diesel engine lubricating oil. Chart rolls out of recording unit two minutes after oil sample is inserted between two electrodes.

Wear in engine and need for filter changes can be determined by regular spectrographic analysis; Altoona laboratory's new Quantometer is doing this job.

Until the new device was installed, it was necessary to burn each oil sample down to an ash and place this ash in an electric arc between two electrodes. The spectrum of light from the arc, which contained wave lengths characteristic of any metals present in the ash, was then recorded on a photographic plate by means of a spectrograph. Finally, the spectrum image thus obtained was measured with a densitometer to determine the quantity of each of the wear metals contained in the sample. This process required about five hours to complete. If results were inconclusive in any given test, it had to be re-run in its entirety.

"In the new device," Mr. Pinney said, "the oil sample is burned directly in an electric arc and variations in the light produce corresponding changes in the voltage output of an electronic circuit governing the movement of a recording stylus." Within two minutes the device determines the metal content of the oil, and then writes its own report.

From the word "spectrum" the spectrograph gets its name. It is an instrument for measuring the wave lengths of radiation from elements when burned in an electric arc. As each metal burns emitting spectral lines of its own characteristic wave lengths, the determination that a particular spectral line at a specific wave length is given off during the burning of a sample is evidence that the metal associated with that wave length is present in the sample. Metals in burning produce more than one characteristic spectral line and some metals produce many. However, each element always produces the same spectral lines and for convenience the strongest line with a definite wave length is selected for quantitative work. Amazingly minute quantities of an element are sufficient to make its characteristic lines appear. Quantities less than one part per million not only make the lines appear, but give them enough intensity that their wave lengths can be measured and used as a means of determining the quantity of the element present.

The elements which the PRR considers important are silver, aluminum, chromium, copper, iron, lead, silicon and boron. The silver can come only from the wrist pin bushings in one type of engine. The aluminum may come from road dirt drawn into the engine with combustion air, but is most likely to come from aluminum pistons. Chromium comes from chrome plated liners. Copper and lead may come from a number of parts such as brass bushings or camshaft bearings, but are most likely to come from the main and connecting rod bearings. Usually high copper without high lead is indicative of wear on brass or bronze bushings or thrust bearings. High lead, without copper, is usually associated with wear from lead overlay when new bearings are put into service.

Both high copper and high lead indicate excessive wear in the copper-lead bearing metal of crankshaft bearings. Iron can come from plain iron liners, pistons (in one type of engine), piston rings, gears or crankshafts. High silicon is usually an indication of road dirt getting into the engine as a result of improper filtration of the combustion air by engine air filters, and probably indicates inadequate air filter maintenance. Boron indicates cooling water leaking into the lubricating oil because the Pennsy uses a boron type water treatment.

It is the job of the spectrographic laboratory to suggest the parts of the engine which may be wearing excessively and to recommend corrective action to prevent an engine failure. The spectrograph indicates only what elements are present and the amounts in the lube oil sample. It cannot predict whether the copper detected comes from main bearings, from gear bushings, or from valve rocker bushings, etc. Reports suggesting corrective action are sent out by the test department. These report forms provide space for reporting by the engine terminal people what was found, and what corrective action was taken. Data from these returned reports does much to increase the accuracy of prediction by the Spectrographic laboratory.

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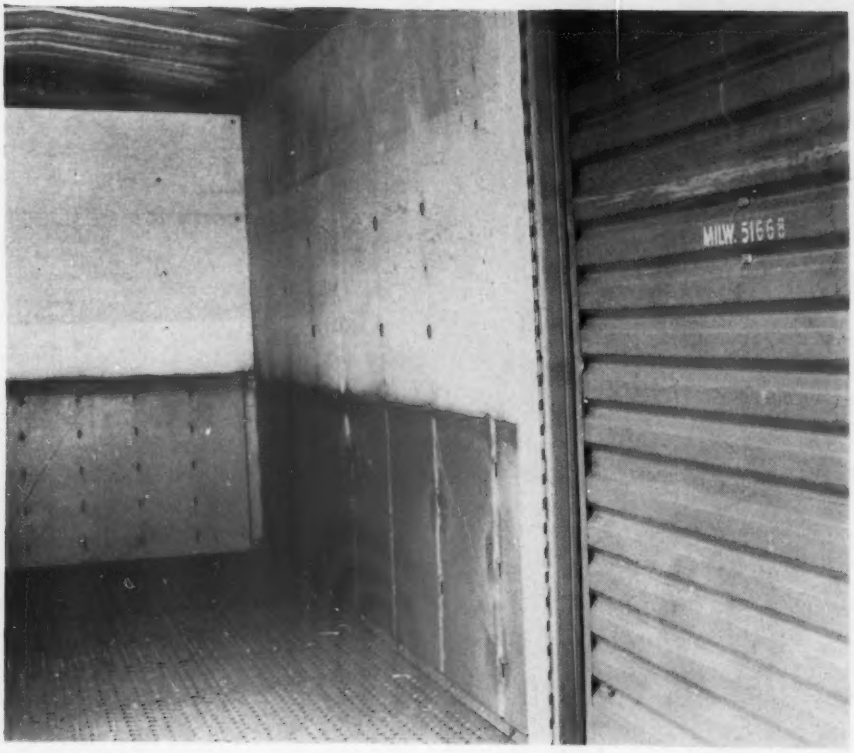
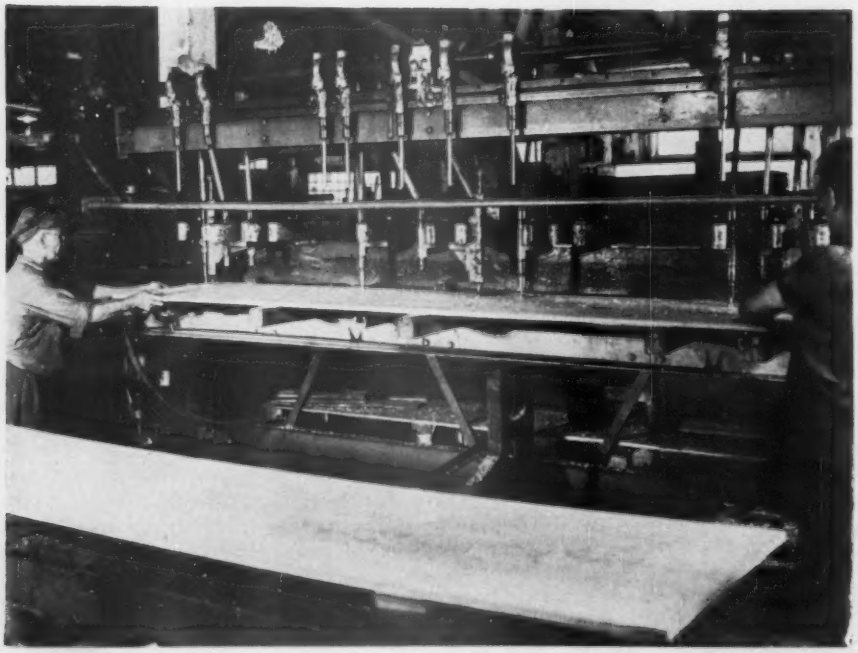


PLYWOOD LINING on Milwaukee box car is secured by end-welded studs and special nuts. Steel linings on lower sides and ends incorporate lading anchors of type different from those used in plywood. Perforated protection plates cover the floor.

On Milwaukee and Reading Cars . . .

ACF Cuts Plywood Lining Cost 7 Per Cent



FIRST STEP for securing plywood lining is to drill counterbored holes in each plywood panel. Four holes are being drilled simultaneously. This technique was first used recently by ACF on 1,400 cars.

A technique for securing plywood lining in box cars, first used recently by the American Car & Foundry Division of ACF Industries, has overcome three barriers to wider use of this lining material.

Plywood was installed on a competitive cost basis with tongue-and-groove siding. The plywood, thus secured, eliminates the possibility of lining theft. It can be easily and economically removed in the repair shop and reused when the steel sides of the cars require maintenance. The fastening method, developed around Nelson end-welded studs and special nuts, made all this possible.

ACF officers estimated that in one 1,000-car lot for the Milwaukee costs-per-car for installing the plywood lining with stud welding were reduced seven per cent, compared with costs for nailing plywood siding to furring strips.

At ACF's St. Louis and Berwick car-building shops, studs to secure side linings were end-welded through predrilled holes in the plywood to the inside faces of car Z-section side posts. One man in each quarter section of a car welded 45

studs at a net production rate of three per minute. Studs to secure the lining on both ends of a car were similarly applied. They were welded to the crowns of the car-end corrugations.

A total of 180 Nelson granular-flux-filled studs, ⅜-in. in diameter and ⅞-in. long, were used to secure side linings for each of 1,400 cars in which ACF used the new technique. Sixty studs were needed to fasten each car's end linings.

At its St. Louis shop, ACF installed plywood linings with this new technique in 1,000 cars for the Milwaukee. The same method was used on 400 cars for the Reading at ACF's Berwick shop.

How Lining Is Applied

First step in the new procedure was to drill four counterbored holes simultaneously in each plywood side panel, using a multiple head drilling fixture. The panels were then placed in position and held temporarily with cross bracing. After studs had been end-welded, through the holes, Nelson flush-type lining nuts were run down on the studs with a power wrench.

The nuts, with tapered threads that will not work loose in service, were secured at an average rate of four per minute. They finished flush with the face of the car lining.

To provide added protection against theft of panels, a few nuts were securely fastened to the ends of studs with small tack welds. When it is desired to remove the plywood temporarily during car maintenance, these nuts can be freed by removing the weld metal with a small hand grinder.

Besides being more difficult for potential thieves to remove than nailed-down plywood, panels installed in this way will be less desirable to vandals because of the predrilled holes. For maintenance, however, they can be removed easily and reinstalled without damage.

ACF also used Nelson end-welded studs to speed production and reduce cost in other applications during construction of the cars. These included securing the wood flooring shims with 16 no-thread studs; fastening ownership plates with four studs each, and fastening the air-pipe bracket with a single stud.

STUDS are end-welded through pre-drilled counterbored holes to side posts while plywood sheets are temporarily braced in position. Plywood lining is secured by special nuts on studs. Nuts run down flush with plywood surface in counterbored holes. Large holes in plywood accommodate lading strap anchors.

Pennsylvania Makes Regular Lube Oil Examinations

(*Continued from page 31*)

The laboratory, beginning in February, 1954, took under control 102 Baldwin freight units. Since then all road and road switcher units of 1,500 hp and over have been placed under spectrographic control. However, in February and March, 1954, there were 251 oil samples received and analyzed from these 102 units. Forty six (18.3 per cent) of these were found to give values indicative of improper conditions in the engines as follows: 2 showing fuel oil dilution, 28 showing bearing defects, 22 indicating water leaks, and six of the oils showing more than one improper condition. Bearing inspections were requested for 27 engines and on 24 of these defective bearings were found. In these engines 221 connecting rod and 249 main bearing halves were renewed. The lab continued to point out bad engine conditions, particularly cooling water leaks. Six months later during July and August, 1954, the 357 samples from these Baldwin units produced only 25 samples indicating improper conditions. These were six cases of fuel oil dilution, three cases of high lead, five cases of excessive road dirt in the oil, and six cases of cooling water leaks. Only three bearing examinations were requested and two of these showed no defects. The third engine needed renewal of only one bearing half.

The Pennsylvania has attempted to stress that this program is a joint endeavor by both the test department and the maintenance forces. A representative oil sample from the crankcase is important. The portion used for the spectrographic analysis represents less than 1 part in 320,000 of the total oil in the crankcase. From this, indications of improper engine conditions are evaluated.

The spectrograph does not indicate copper or any other metal in a sample unless it actually exists. The indication as to the part which is breaking down is based on previous experiences and on the other metals present in the sample. When the spectrograph results indicate that an unusual amount of copper is actually present, then some part in the engine containing this metal must be wearing excessively. If examination of the part indicated by the test department shows no failure, it has proved worth while to extend the inspection to other critical parts containing or causing the presence of this same element. This has been particularly true in the case of water leaks. Many water leaks are intermittent, depending on temperature, and their location is frequently difficult.

Keeping a continuous record of the levels of critical elements has assisted the PRR in extending its scheduled shopping periods by several months. At the present time the road is overhauling about 15 fewer units monthly than would have been required with shopping schedules used prior to the introduction of the spectrographic analysis. However, spectrographic analysis is only part of the overall oil testing program and the remainder will be discussed next month.

Special Flat Cars Popular in 1957

OVER 40 SPECIAL FLAT CARS were ordered in 1957. Among them were ten Chicago & Eastern Illinois depressed-center units assembled at the road's Danville, Ill., shop. General Steel Castings supplied bodies.

PREHEATED CASTING in metal box is covered with powdered asbestos to retain heat for welding.

COMBINED WATER AND AIR PRESSURE reveals leaks which are marked with chalk. Pivoted supporting stand easily lifts valve seats to top.

How MoPac Reclaims Diesel Cylinder Heads

Cracked cylinder heads get specialized attention on a step-by-step production line in the Missouri Pacific's North Little Rock, Ark., shops. This operation is not duplicated in any other MoPac shop. All cracked heads from any locomotive maintained elsewhere on the railroad are shipped to North Little Rock for this reconditioning.

Some twenty-two individual steps are required. A number of accurate machine tools, including boring mills and drill presses, are used along with special jigs and fixtures. Many appliances were shop-made for handling heads during the progress of the job. Redesigned cutting tools greatly expedite the work. An outstanding example is a boring tool which completes over twenty-five heads (four holes each) per day. This operation of boring the four valve seats prior to application of new inserts was formerly done at a rate of four to five heads per day.

Reconditioning begins with chemically cleaning the heads. Shops over the system do their own cleaning before heads are sent in for repairs.

Steps 1 to 3 The first step is accurately locating the crack in the casting which, if left unrepaired, would permit water from the engine cooling system to get inside the cylinder. The head is mounted on a supporting stand, which is pivoted so the head can be turned 180 deg to bring the valve seats to the top. A water test fitting is attached which allows water under high pressure, augmented by the shop air pressure, to flow into water jacket cavities. Where the water emerges from the casting is marked with chalk to define the area where welding is to be done. The valve guides, springs and plates are then disassembled.

COVER PHOTO

Valve seats are rough-bored before welding to insure solid metal around and under the insert. This is actually Step 4 in the process.

Step 4 The valve seats are rough bored before welding. A new oversize diameter of $3\,^{23}/_{32}$ in. is bored $^{3}/_{16}$ in. deeper than the length of an insert to insure solid metal around and under the insert.

Step 5 The valve guide openings in the casting are packed with cast iron dust to prevent scaling during the heating operation. Chalk marks are replaced with chisel marks.

Step 6 Before welding is begun, the casting is pre-heated for 30 to 40 min in an oil-fired furnace at 1,400 deg F. This insures that the casting will not crack elsewhere when the high temperature of the welding torch is applied.

Step 7 The pre-heated casting is placed in a metal box on a low revolving stand, and is covered with powdered asbestos to retain heat during welding.

Step 8 The crack is closed by oxyacetylene welding with proper welding rod.

Steps 9 to 11 The cylinder head is returned to the furnace for a normalizing period of one hour at 1,440 deg F, with temperature controlled by an electric pyrometer. The casting is then removed from the furnace and allowed to cool slowly for 48 hours under a covering of flaked asbestos. When completely cooled, the head is removed from the

LEAKS ARE REPAIRED by oxyacetylene welding. Revolving stand positions work for easy access.

BORING MILL removes unwanted welding deposits.

RADIAL DRILL with special designed boring tool completes up to 25 heads (four holes each) per day. Previous daily output was four to five per day.

VALVE INSERTS are applied with shop-made impact tool. Inserts kept on dry ice facilitate application and insure tight fit.

box and is blown thoroughly to remove asbestos and the residue of cast iron dust.

Steps 12 and 13 The casting goes to a boring mill to have welding deposits machined from the face of the casting. It then goes to a drill press where the valve seats are rough bored.

Step 14 The head is then returned to the water test jig used in Step 1 to insure (1) that the original crack is properly repaired, (2) that there is no porosity in the weld, and (3) that the first machining operations develop no new leaks. This step saves considerable time in reclamation since any defect at this point will return the head to the start of the reclamation process.

Step 15 This is a hand grinding operation to remove welding slag inside the head. This is done with a die grinder and pneumatic chisel.

Step 16 The new valve guides are inserted in the head by hydraulic pressure.

Step 17 The four insert holes are rough- and finished-bored on the drill press for application of the new size minus 0.003-in. valve inserts.

Step 18 Another water test is given for leaks.

Step 19 The head is now ready for application of the valve inserts, or rings. A supply of these are kept on dry ice to shrink the metal so that expansion under normal temperatures in properly bored castings will make a tight fit. A shop-made impact tool firmly places the insert ring on the bottom of the bored cavity to insure that the seat will not come loose from the impact of the valves.

Step 20 The valve inserts are ground to insure positive closure of the valve during fuel cycles.

Steps 21 and 22 The valves and springs are reassembled into the head which is now ready for the final step. This is hand lapping of the face of the joint on the head to insure a perfect fit between the head and the cylinder liner. With this step completed the reconditioned head can be installed in an engine.

While the 22 operations represent reconditioning of one type of cylinder head, there are variations for those of other types, and for those of other builders. Special conditions sometimes alter this cycle.

HEAD, WITH VALVES AND SPRINGS assembled, will have joint between head and cylinder liner hand-lapped.

Aluminum Sills Take Million Pound Impact

(*Continued from page 27*)

two cars involved in the test. The coupler on the strike car was replaced by a solid steel strike block machined to fit into the coupler pocket, while that on the test car was replaced by a dynamometer.

The impact tests were carried out on grades on a CNR spur line at Kingston. By starting the strike car from various locations on the grade, it was possible to obtain strike velocities from 2 to about 15 mph.

Two series of tests were conducted with friction type draft gear up to an impact force of 935,000 lb. In the first series, the test car was free and did not come in contact with the back-up cars. In the second series, the test car was backed-up by four fully loaded box cars to determine what effect this might have on the stresses in the center sill and car body. A third series of tests was undertaken in which rubber draft gear replaced the friction draft gear in the strike ends of both cars. In this series of tests impact forces of up to 947,000 lb were reached.

Aluminum hopper cars made their first appearance in Canada in 1948. These 30 open-top cars for the R&S were made from Alcan 65S-T6 plate and extrusions, and assembled with Alcan 55S-T6A rivets. The underframe was steel. Between 1949 and 1951, 60 additional cars were built. In 1955 the R&S bought 28 aluminum open-body hopper cars of welded construction. These cars incorporated many new design features.

Early in 1956, 16 all-aluminum covered hopper cars were built for Alumina Jamaica. The cars were of all-welded construction and were the first to incorporate AAR type aluminum center sills.

In 1957, 30 aluminum open-body hopper cars of all-welded construction were built for the R&S. Their design incorporated many of the results of the static and impact tests. They have welded aluminum center sills of the AAR type.

Half the load is carried to the center sill. The center sill is supported by the two bolsters and the two crossbearers. The bolsters carry the load to the trucks and the crossbearers carry the load to the car sides. The other half goes to the car sides which, in turn, are supported by the bolsters.

Standard steel girders for hopper car sides of this type usually have vertical stiffeners at about 3-ft 6-in. intervals. Wider spacing is usually impractical since the panels will flex more readily than small panels and the paint may flake off and eventually rust will accelerate corrosion. Because this does not occur with aluminum, spacing of vertical stiffeners can be increased to about 8 ft, making the structure more efficient and entailing considerably less labor in fabrication. A special box-type aluminum extrusion was designed for the side plate and a heavy aluminum extrusion was used for the side sill. In designing the center sill, the eccentricity of the load is taken into account. The welded area, as well as heat-affected zone of the center sill, was not included in the effective net area.

These new cars were built by Canadian Car & Foundry. Aluminum welding technology has made big strides forward since 1950. Satisfactory welds can be made at high speeds with either hand or machine methods, using Alcan's inert metal arc process. In this IMA process, the electrode is the filler wire and the arc is shielded by an inert gas, such as argon.

At Cancar's plant, the automatic welding jigs were fitted with the IMA equipment. The sides of the cars are made up of sheets approximately 60 in. wide joined by vertical welds approximately 8 ft long. This job was done on jigs normally used for welding steel car floors. Other automatic jibs were used for assembling the side sill and side plate to the completed side sheets. Remainder of the car was hand welded.

ICC Summarizes 1957 Railroad Progress

(*Continued from page 28*)

try for line-haul service is the direct-drive diesel (brought from Europe, where it is widely used) which eliminates the heavy and costly electric drive. It has been put into use on some of the new streamlined trains. Widespread use of diesel-electric locomotives has caused plans for new electrifications to be dropped, at least for the present.

"Some existing electrifications have been eliminated in favor of diesels, but the remaining mainline electrifications, have recently been re-equipped with new all-electric locomotives, are likely to continue in use for a long time.

"Oil-burning gas turbine locomotives, although produced at present by only one manufacturer and so far used by one railroad (which has 55 in use or on order), may eventually challenge the diesels, especially for long-haul, heavy-duty runs. They have a lower thermal efficiency than the diesels and a relatively high idling fuel consumption, but burn very low-grade oil, and should have a lower maintenance cost because they have fewer moving parts."

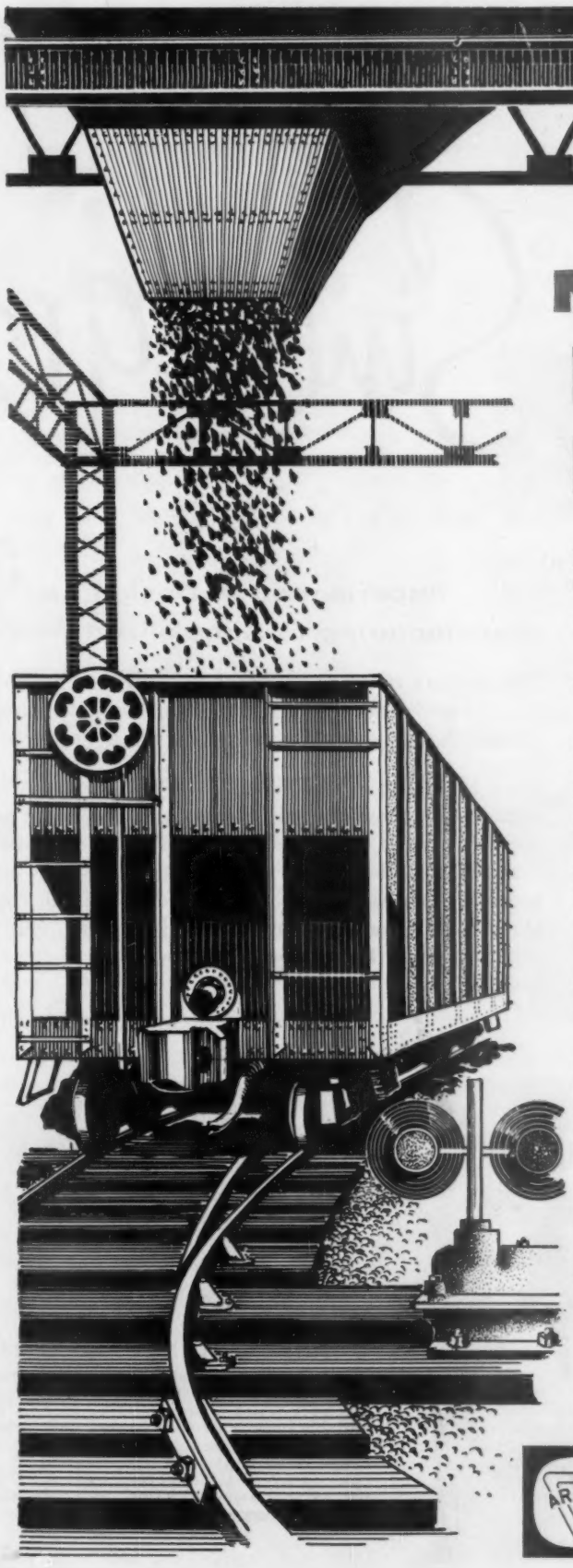
Passenger Cars "Most of the lightweight trains have been tested in regular operation to win passenger acceptance of the lighter, more economical, high-speed trains. . . . How well some of them will stand up in long life of use remains to be seen . . . . Trains of this type are of two classes—those made up of cars which can intercouple with, and operate in, trains with conventional equipment; and those which cannot. Before many more of these trains are built, railroad management should decide whether to abandon or retain the flexibility of universal standard coupling of all equipment.

"Trains with all passengers seated at dome height were a daily sellout, and double-deck, gallery-type cars continued popular for commuter service on three railroads. Both types are equipped with standard couplers."

These Two ICC Legislative Recommendations Could Affect Your Operations . .

■ **"We recommend that the Safety Appliance Acts be amended so as to give the Commission authority to prescribe rules, standards, and instructions for the installation, inspection, maintenance, and repair of power or train brakes." (*The Commission alleges that the voluntary AAR brake code has not produced results the ICC considers desirable. This recommendation was first made in 1956. Hearings were completed by both Senate and House, and the Senate passed its bill. No further action was taken by the house.*)**

■ **"We recommend that the Locomotive Inspection Act be amended so as to eliminate the provisions relating to the appointment of the director and assistant directors of locomotive inspection by the President, and that those positions be placed in the classified service, and, further, that the detailed requirements relating to the duties of the inspectors be eliminated. We also recommend the elimination of the oath requirement in the inspection reports." (*This is part of a program to consolidate all railroad equipment inspections in the Bureau of Safety and Service, eliminating "artificial separations of work" between several types of inspectors. Action was first recommended in 1954. Committee hearings have been held but no bill ever been reported out of either committee.*)**



NEW ARMCO
High Strength Steel Keeps Car Costs Low

Here are two ways Armco High Strength Steel can help trim yearly car costs:

1. **Cars made from this special steel last much longer —stretch original cost over many more years.**
2. **Annual costs stay down because cars made from Armco High Strength Steel need little maintenance.**

Ordinary steel can't match the damage-resisting strength of Armco High Strength Steel. What's more, this durable steel lasts longer in service. It has 4 to 6 times the atmospheric corrosion resistance of ordinary steel.

To make the most of this extra corrosion resistance and higher strength, car builders are using Armco High Strength Steel in the same thicknesses they formerly specified for regular carbon steel. Their aim is longer car life at lower lifetime cost.

To investigate the cost-saving advantages of Armco High Strength Steel, just fill in and mail the coupon or contact the Armco Sales Office near you.

Armco Steel Corporation
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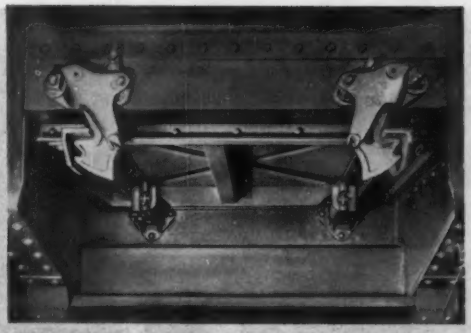
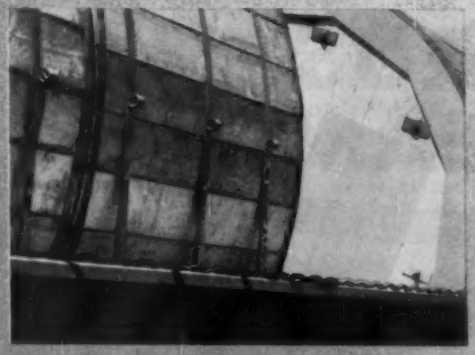


DROP BOTTOM SPRING HINGES AND ADJUSTABLE LOCKS

Drop Bottom Gondolas equipped with these two Wine products provide the shipper and receiver of the lading with a positive closure and afford a fast, economical one-man operation, with selective single or multiple opening of doors.



CONTINUOUS LADING BAND ANCHOR

Wine's continuous offset bar for top-coping applications provides a secure anchor for lading bands every 7½" of its entire length. Permits the use of all types of banding material.

DROP END LOCKS AND END BALANCERS

The *complete* drop end combination from operating and security standpoints! Interlocked corners provide rigidity to keep the sides from spreading under load. The balancer incorporates the hinge function . . . permits a one-man, time and labor saving closure.

UNIVERSAL LADING BAND ANCHORS

Easily applied on all flat cars and gondolas, the Wine Universal Type Anchor features 360° rotation for tie-ins from any direction. Versatility of use permits welding on coping at important locations as well as mounting in the floor. Drop flush when not in use.

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The adjustment feature allows compensation for construction differences and readily permits adjustments necessitated by wear. Wine Adjustable Hopper Locks are adaptable to built-up, structural hopper openings as well as cast steel frames.

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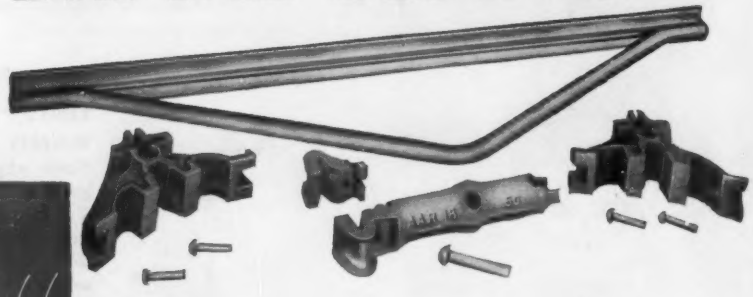

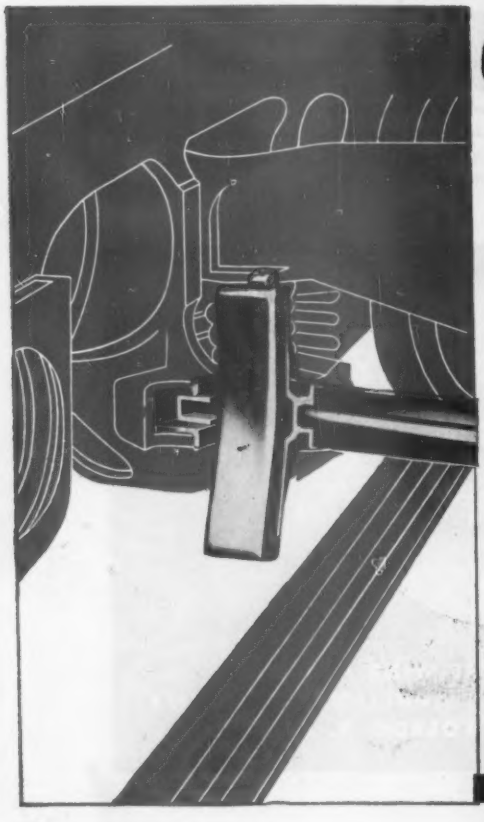

ANY PART RENEWABLE
Without Disturbing the Truss!

OTHER IMPORTANT FEATURES:

- One piece FORGED truss
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- Interchangeable Right and Left Brake Heads Are Easily Applied without Dismantling Truss

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LEARN AIR BRAKES WITH COLOR SCHEMATICS

AB Brake Equipment

Installment 2D

Emergency Application

Accelerated Release After Emergency Application

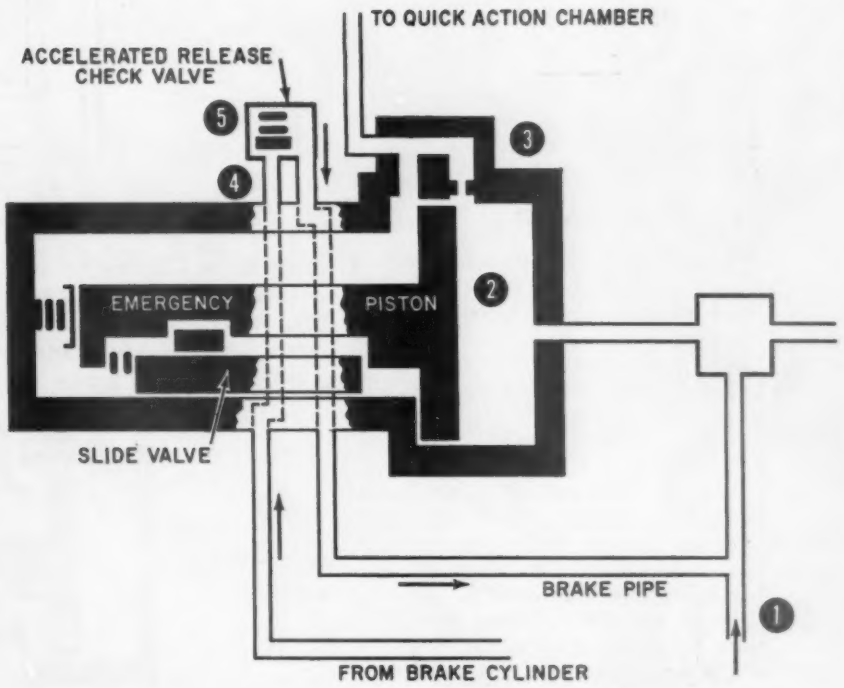
(Sketch 17)

When brake pipe pressure on the face of emergency piston is increased sufficiently after emergency application, the piston moves to the left compressing return spring *137*. The emergency slide valve blanks emergency reservoir port *e3* in the seat which bottles this volume and assures that no further change takes place in emergency reservoir pressure until the service slide valve moves to release and makes connection with the auxiliary reservoir.

Brake cylinder pressure is now connected to the under side of the accelerated release ball check and check valve. Because the auxiliary reservoir and brake cylinder volumes are connected, the pressure of these combined volumes is greater then that of the brake pipe above the checks. The check valves are unseated and permit flow into the brake pipe via passage *b4* until the pressures are within 10 psi of equalization.

This is the fourth installment on the AB Equipment. The first installment and color chart appeared in November, 1956, p 87, the second in January 1957, p 48, and the third in July, 1957, p 49.

In coloring Sketch 17, a heliotrope pencil should be used to color the space at the left of the emergency piston including the short passage marked "to Quick Action Chamber". Dampen and let dry. In pink, color the passage from the brake cylinder to the under side of the accelerated release check valves. From there, color in yellow the brake pipe passages and the space at the right of the emergency piston.



Sketch 17

Emergency Portion Accelerated Release

1. Brake Pipe pressure is building up.
2. It moves Emergency Piston to Accelerated Release position.
3. Charging port is opened from Brake Pipe to Quick Action Chamber.
4. Emergency Slide Valve connects brake cylinder passage to underside of Accelerated Release Check Valve.
5. Check valve is unseated by higher brake cylinder pressure. Brake cylinder pressure feeds into brake pipe.

Dampen each individual color when completed and let it dry before proceeding.

Completion of Accelerated Release

(Sketch 18)

The Quick Action Chamber is being charged through the charging choke and as soon as the pressure on both sides of the emergency piston become substantially equal, the return spring will move the emergency piston and slide valve from accelerated release to charging position. This slide valve movement blanks port *c9* in the seat and closes the connection between brake cylinder and brake pipe.

Color the space at the left of emergency piston in heliotrope,

stopping at the charging port. Dampen and let dry. From the charging port, with yellow fill in the space at the right of the emergency piston, continue through the brake pipe passages, and end up on top of the accelerated release check valve. Dampen and let dry. With a pink pencil, color the brake cylinder passage *c3* to the point where the slide valve contacts its seat. In pink dashes, color the passage (partly hidden) to the under side of the accelerated release check. Dampen and let dry.

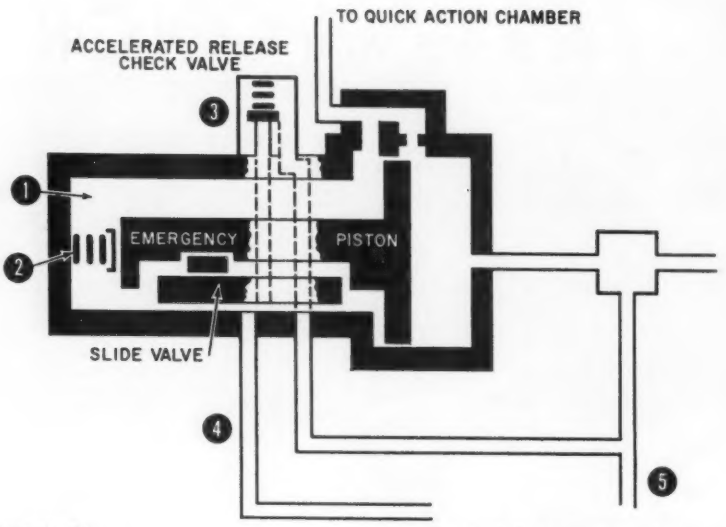
Service Portion Release After Accelerated Release

(Sketch 19)

When brake pipe pressure becomes slightly higher than auxiliary reservoir pressure, the service piston and its slide valve are moved to either retarded recharge or full recharge piston and the brakes will be released and reservoirs recharged as under "Release And Charging Position".

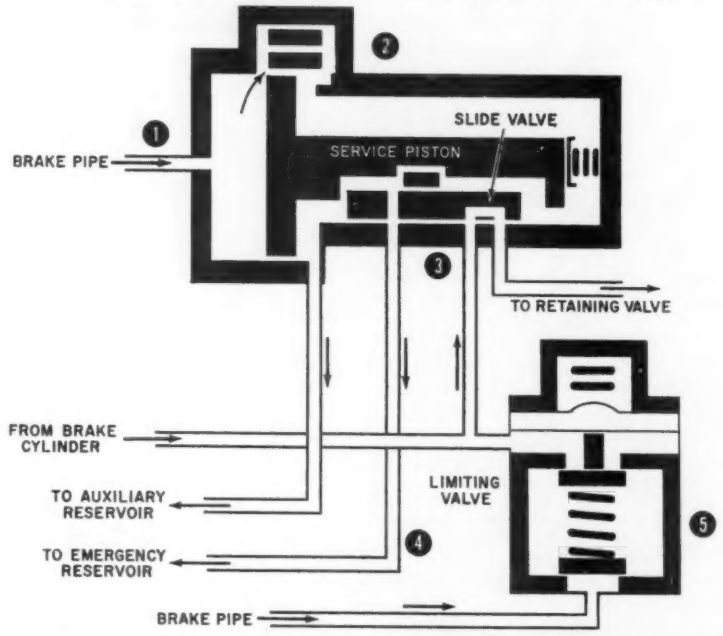
With a yellow pencil, color the space at the left of the service piston and the passage leading into it. Stop the yellow color where the passage enters the space at the right of the piston. From there, color the entire space at the right of the piston, on top of graduating valve and slide valve, and the passage leading to the auxiliary reservoir in dark green. Continue the green color through the port in the slide valve (past the graduating valve) but stop at the point where the slide valve contacts its seat. Dampen each of the above colors as completed and let dry before proceeding.

With an orange pencil and starting from the green at the slide valve seat, color the passage leading to the emergency reservoir. With a pink pencil—in dashes—color the passage from the brake cylinder into the space under the diaphragm in the quick service limiting valve. Continue by coloring the passage into the slide valve cavity, from there to the retaining valve, and to atmosphere. With a yellow pencil, color the space between the two check valves in the quick service limiting valve and its connecting passage.



Sketch 18
Emergency Portion at Completion of Accelerated Release

1. Quick Action Chamber has been charged to equal pressure of Brake Pipe.
2. Return Spring moves emergency piston and slide valve from Accelerated Release to Release position.
3. Accelerated Release Check Valve is seated.
4. Emergency slide valve blanks brake cylinder passage c-3.
5. Brake Pipe will continue to charge from Brake Valve or Supply Line.



Sketch 19

Service Portion Release After Accelerated Release

1. Brake Pipe pressure, having become greater than that of Auxiliary Reservoir, moves Service Piston and Slide Valve to Release Position.
2. Charging port is opened from Brake Pipe to Auxiliary Reservoir.
3. Slide Valve (SV) connects brake cylinder passage to Retaining Valve and Exhaust.
4. Auxiliary Reservoir air passes through slide valve to Emergency Reservoir.
5. Brake Pipe pressure enters space between Limiting Valve Check Valves.

"Pennsy" standardizes on high strength low alloy steels containing nickel for ALL new hopper cars

Pennsylvania Railroad recently received delivery of a fleet of new 70-ton hopper cars.

The high tensile steel plates which contact the lading are expected to last approximately 50% longer than the carbon steel sheets formerly used in hopper cars of this type.

To provide this increased life expectancy, the "Pennsy" is standardizing for all new open-top hopper cars, on the use of high strength low alloy steels containing nickel, for all body sheets which contact the lading.

This policy provides extra strength, wear- and corrosion-resistance without adding to weight. As far as maintenance costs are concerned, the use of high strength low alloy steels permits the "Pennsy" to cut heavy repair work and "out-of-service" time in half.

High strength low alloy steels are ideal for railroad freight car bodies

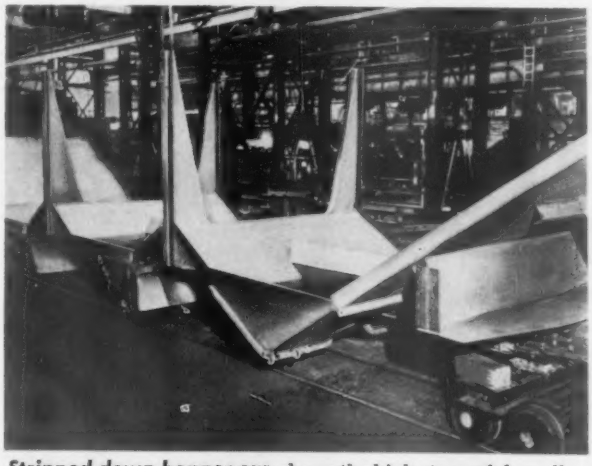
They provide:

(1) Yield strength of 50,000 psi minimum in the as-rolled condition, which permits either:
   (a) appreciable weight reduction by using thinner sections . . . or
   (b) if the same sections are used as for carbon steel, much better durability and minimum maintenance.

(2) Excellent response to usual fabrication operations . . . easy forming . . . easy welding.

(3) Good resistance to corrosion, abrasion and impact.

Send for "Nickel-Copper High Strength Low Alloy Steels." A copy is yours for the asking.



Stripped down hopper car shows the high strength low alloy nickel-containing steel sheets used in fabricating the PRR's new triple-hopper type cars. The use of high strength low alloy steels is expected to lengthen car life, reduce maintenance costs and provide greater equipment availability.

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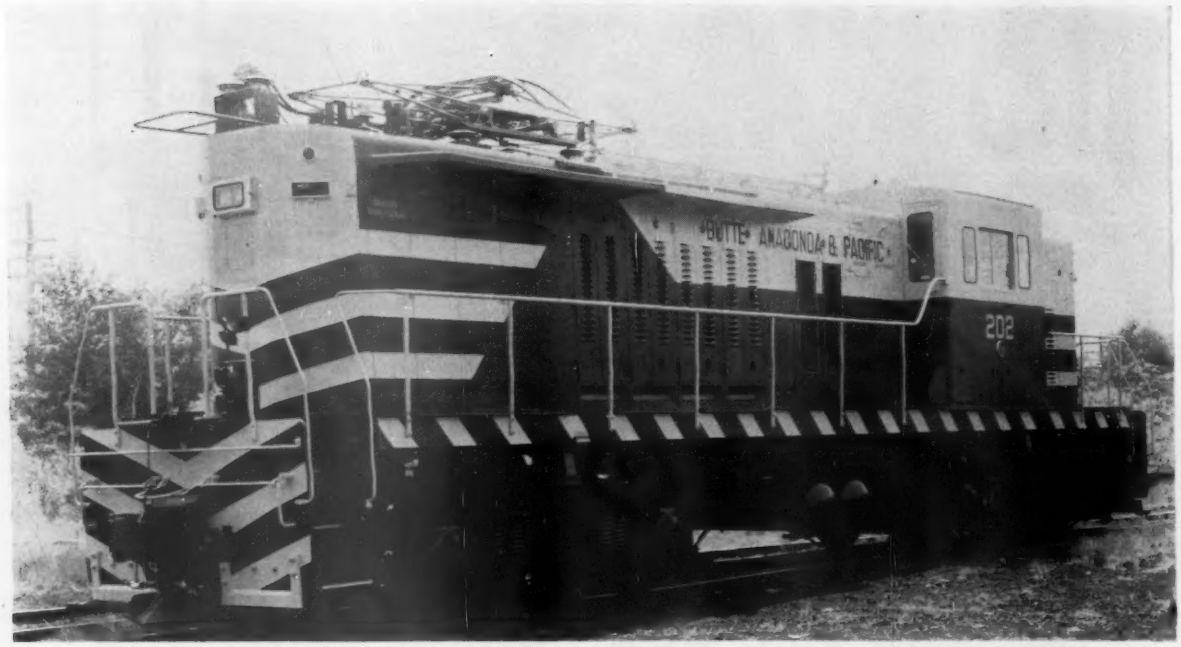
ELECTRICAL SECTION



The completed locomotive from the No. 2 end, showing multiple-unit connections for high-voltage trolley cable and control train lines.

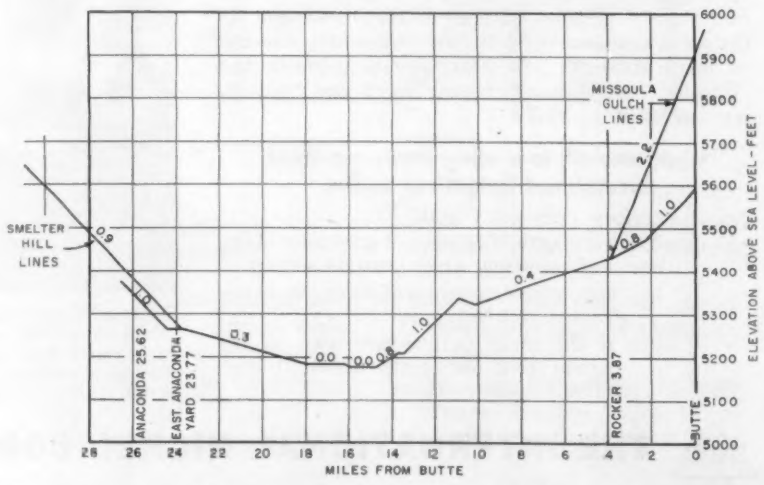
Old Electrification Adds New Electrics

Main line capacity of copper railway is increased by the addition of two new electric locomotives

THE BUTTE, ANACONDA & PACIFIC was electrified in 1913 with 1,500 volts d-c. The original fleet of 28 electric locomotives were recently supplemented by seven diesel switchers and main line capacity has now been increased by the addition of two new electric locomotives supplied by the General Electric Company.

Copper ore from the mines at Butte, Mont., to the smelter at Anaconda, Mont., comprises the major part of the traffic over the 26 route and 56 track miles of the railroad.

Two of the older 80-ton electric locomotives can handle 4,000 tons of ore over the profile. Ultimately the railroad plans to haul eight trains per day, each carrying 7,500 tons of ore. This weight of train can be hauled by the two new units which, in multiple, develop a starting tractive force of 150,000 lb and a continuous tractive force of 90,800 lb



Service requirements of the new motive power units are indicated by the profile.

at 20.5 mph. The units have a B-B arrangement and each weighs 250,000 lb.

The locomotive platform is of welded plate construction with overlapping, rather than butt welds, to reduce fitting time and promote an accurately shaped weldment. Since the platform is relatively long, a fish-belly design is used to give the required stiffness. The longitudinal space between the main sills is used as an air duct to supply traction motor ventilation.

Car body filters are installed in the blower compartment walls to insure clean ventilating air for the equipment.

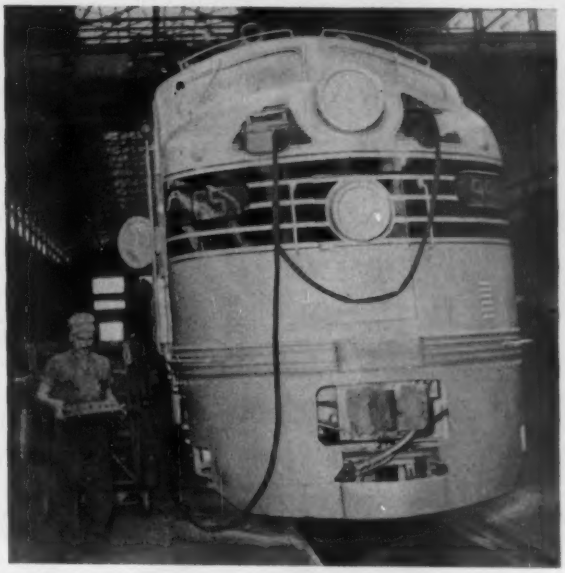
The welded two-axle truck has roller bearing journals. One brake cylinder per wheel actuates clasp-type brakes. The GE-729, 4-pole, d-c motor is rated 600 hp at 1,200 volts. Gear ratio is 82:15.

An m-g set driven by a 2,400-volt d-c motor furnishes excitation during regenerative braking. A belt-driven auxiliary generator provides 75-volt power for control operation, lights and battery charging. A ventilating blower for rotating equipment is driven from an extension on the motor armature shaft.

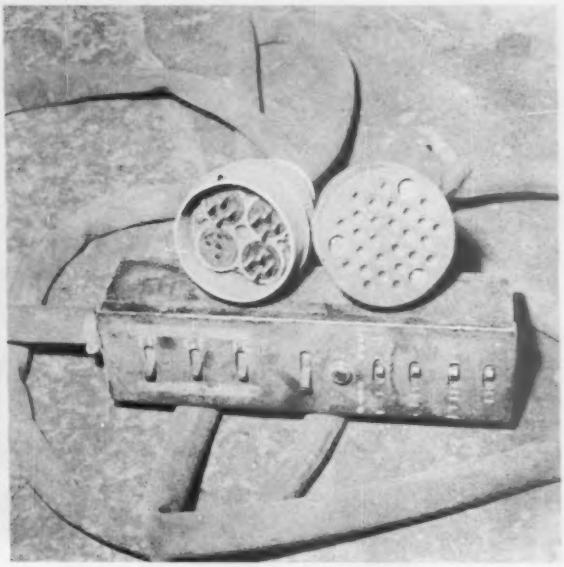
Air brake equipment is Westinghouse Air Brake Company 6SLM independent and automatic. Compressed air is supplied by two Westinghouse 2CMD air compressors. Regenerative braking is available from top speed down to approximately 11 mph.

Electrical protection for the whole locomotive is furnished by a JR high-speed circuit breaker. Auxiliary circuits are protected by fuses.

Possible life of electric locomotives is indicated by the fact that the new units are entering service side by side with the original locomotives built 45 years ago. Improvements in electrical equipment made since that time are indicated by the fact that the new units have a 46 per cent improvement in power-weight ratio.



A diesel-electric locomotive is walked forward and back in the No. 2 position, while a second man in the cab controls brakes.



A 27-point control plug and a control box with 8 switches are used to test locomotive functions. The brake plug serves only to bring 64 volts to the control box.

Walking the Locomotive . . .

AFTER ALL DIESEL locomotive control circuits are checked for continuity on the Chicago, Burlington & Quincy at West Burlington, Iowa, a second test is made to insure proper m-u operation.

The continuity test employs a standard control plug and cable on the end of which is a box containing 27 miniature 110-volt lamps. As each circuit is energized, the corresponding lamp lights, showing that the circuit is live and that the polarity is right.

To insure correct m-u operation, the two plugs and the control box illustrated are used. One of the plugs is a standard 27-point control plug and the other is a brake plug which is used only to bring battery voltage to the control box.

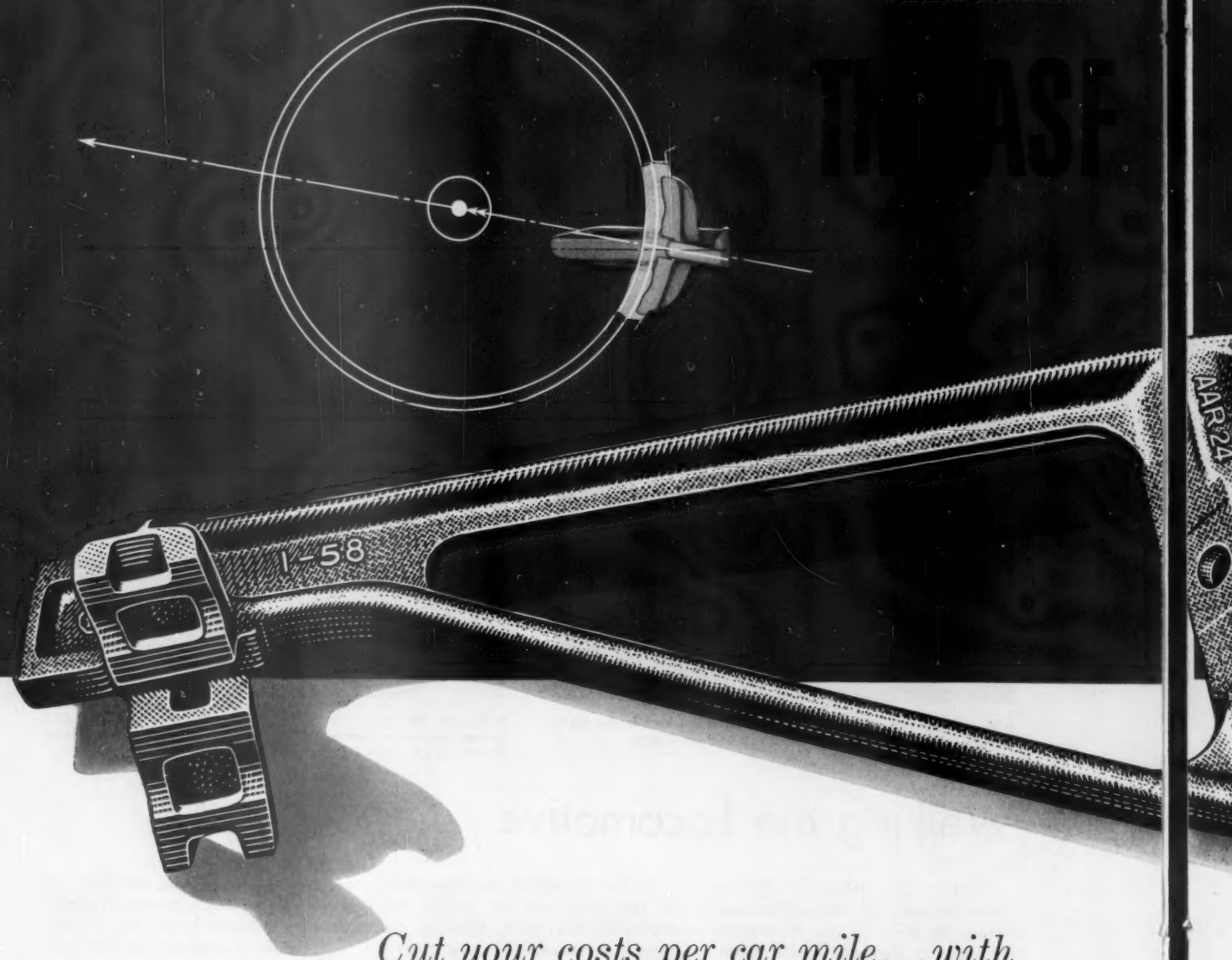
The four switches at the left of the control box are, respectively, fuel pump, generator field, *PC* control and reverser. The four switches at the right control the eight engine speeds. A test light in the center shows control power is on.

The various control functions are tried for passenger power, the locomotive is moved in the No. 2 position while a man in the cab controls the brakes.

E-8 and E-9 locomotive engines are run with the generator field connected in circuit and the contactors open.

E-5, E-6 and E-7's are tested without running the engine. Two men inside the locomotive check the operation of valves, contactors and field control.

NOW A.A.R.



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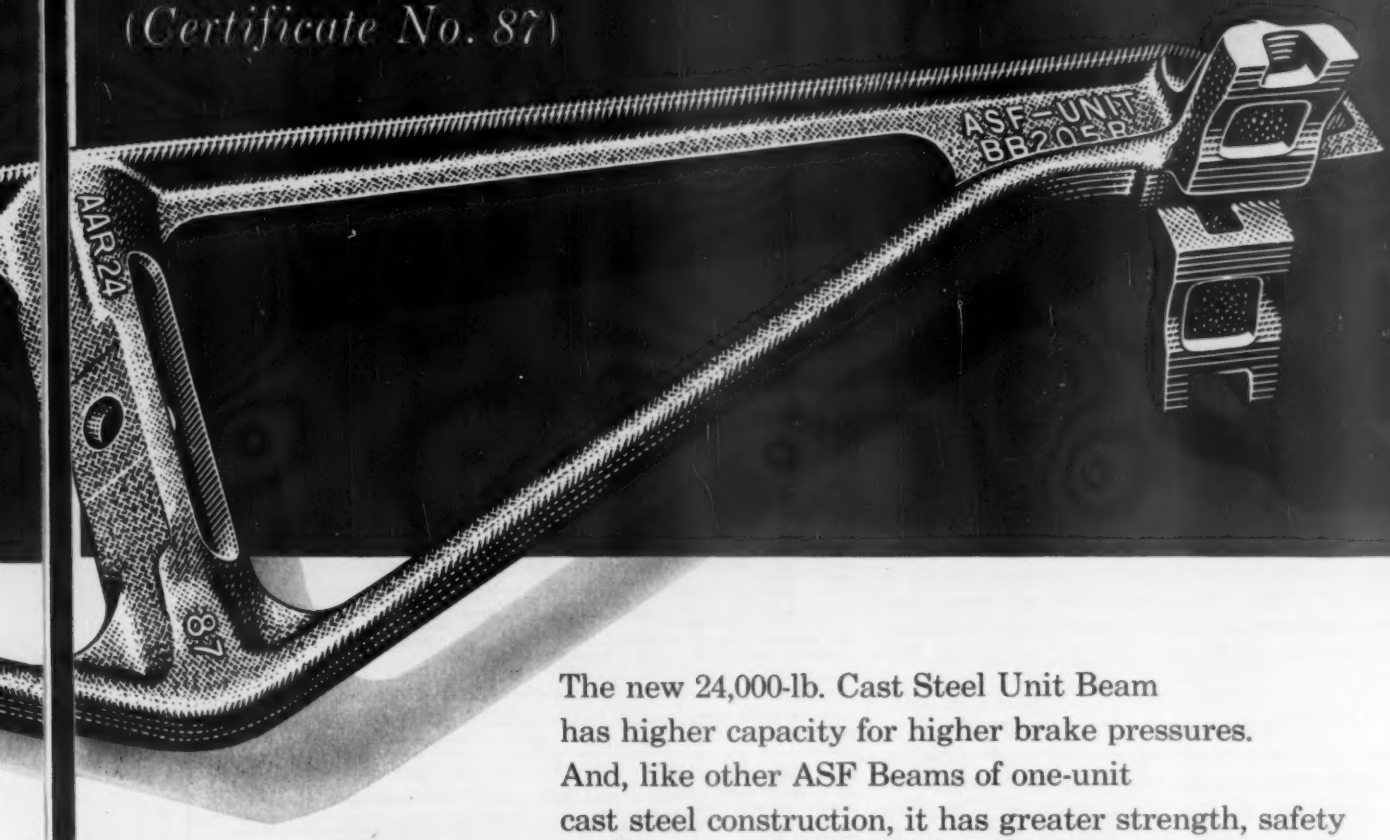
ASF CAST STEEL UNIT BEAMS

STANDARD...

No. 24 cast steel unit beam

(Certificate No. 87)



The new 24,000-lb. Cast Steel Unit Beam has higher capacity for higher brake pressures. And, like other ASF Beams of one-unit cast steel construction, it has greater strength, safety and rigidity . . . costs far less to maintain.

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Prudential Plaza, Chicago 1, Illinois

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7 Roll Them Out Like New

Receiving and Inspecting Equipment at the Backshop

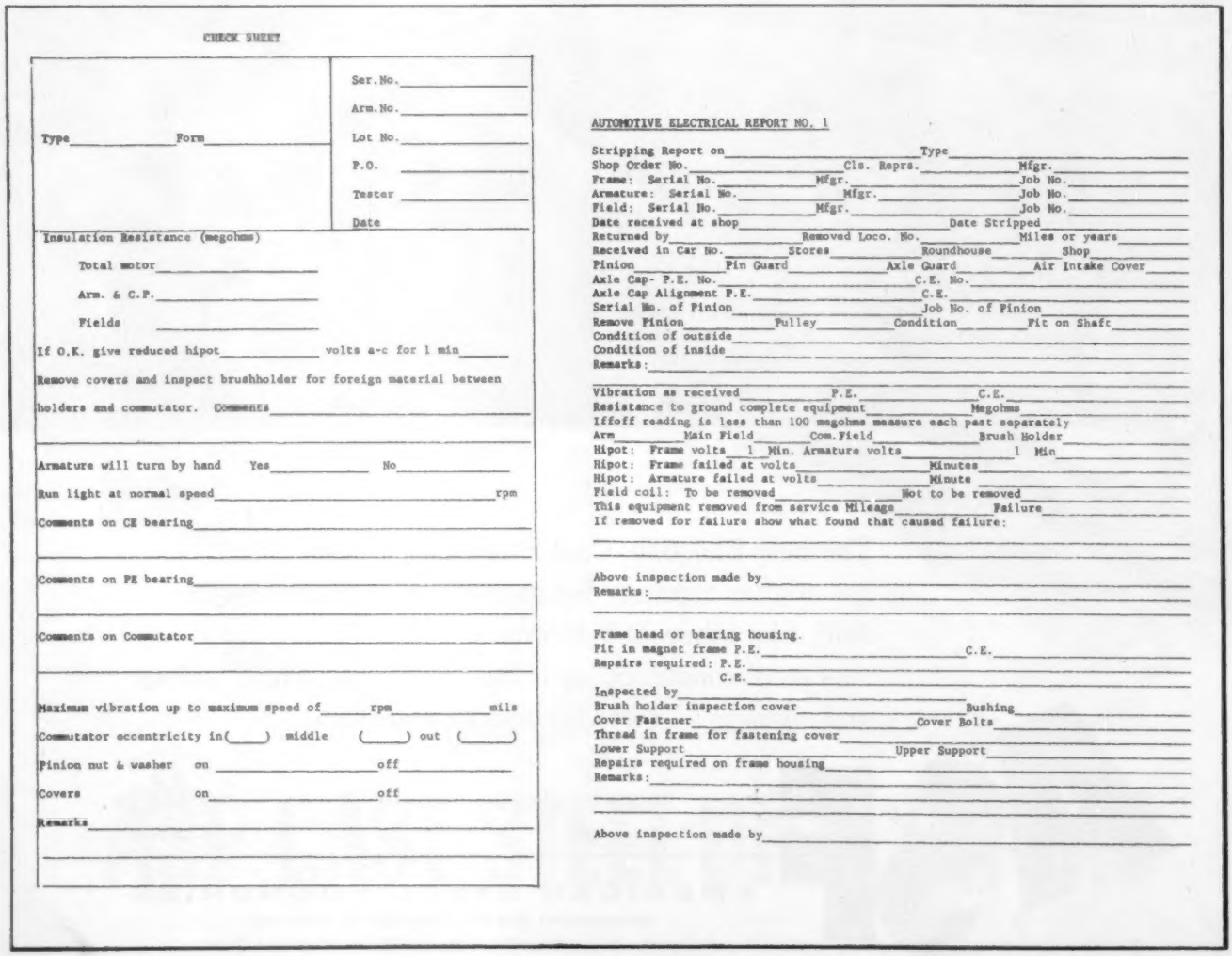
A preliminary inspection with simple tests can be used to determine if a job should be done in the railroad shop or sent out to a service shop

Up to this point we have been thinking about subjects applying to backshop work in general and the "hospitalization" of electric rotating equipment. Now we will examine closely the things that are actually done in a shop, and the reasons for the procedures discussed.

Railroad backshops vary greatly in size, and in their facilities and equipment. Some are able to handle all classes of repairs. Many, however, draw the line at heavy repairs. In many such cases advantage is taken of locomotive manufacturers' service shops or "unit-exchange" plans to handle heavy repair jobs. Therefore a decision must be made when a machine comes to the shop: shall the job be done here or shall it be sent out? A preliminary inspection with simple tests will furnish the basic information needed to help make this decision.

This is the seventh article in the series covering heavy maintenance of locomotive electrical equipment.

Part 7 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.



CHECK SHEET

Type_____Form_____

Ser.No._____
Arm.No._____
Lot No._____
P.O. _____
Tester _____
Date

Insulation Resistance (megohms)

Total motor_____

Arm. & C.P._____

Fields _____

If O.K. give reduced hipot_____ volts a-c for 1 min_____

Remove covers and inspect brushholder for foreign material between holders and commutator. Comments_____

Armature will turn by hand Yes_____ No_____

Run light at normal speed_____rpm

Comments on CE bearing_____

Comments on PE bearing_____

Comments on Commutator_____

Maximum vibration up to maximum speed of_____rpm_____mils

Commutator eccentricity in(____) middle (____) out (____)

Pinion nut & washer on _____off_____

Covers on_____off_____

Remarks_____

AUTOMOTIVE ELECTRICAL REPORT NO. 1

Stripping Report on_____Type_____
Shop Order No._____Cls. Reprs._____Mfgr._____
Frame: Serial No._____Mfgr._____Job No._____
Armature: Serial No._____Mfgr._____Job No._____
Field: Serial No._____Mfgr._____Job No._____
Date received at shop_____Date Stripped_____
Returned by_____Removed Loco. No._____Miles or years_____
Received in Car No._____Stores_____Roundhouse_____Shop_____
Pinion_____Pin Guard_____Axle Guard_____Air Intake Cover_____
Axle Cap- P.E. No._____C.E. No._____
Axle Cap Alignment P.E._____C.E._____
Serial No. of Pinion_____Job No. of Pinion_____
Remove Pinion_____Pulley_____Condition_____Fit on Shaft_____
Condition of outside_____
Condition of inside_____
Remarks:_____

Vibration as received_____P.E._____C.E._____
Resistance to ground complete equipment_____Megohms_____
Iffoff reading is less than 100 megohms measure each past separately
Arm_____Main Field_____Com.Field_____Brush Holder_____
Hipot: Frame volts__1__Min. Armature volts_____1 Min_____
Hipot: Frame failed at volts_____Minutes_____
Hipot: Armature failed at volts_____Minute_____
Field coil: To be removed_____Not to be removed_____
This equipment removed from service Mileage_____Failure_____
If removed for failure show what found that caused failure:

Above inspection made by_____
Remarks:_____

Frame head or bearing housing.
Fit in magnet frame P.E._____C.E._____
Repairs required: P.E._____
C.E._____
Inspected by_____
Brush holder inspection cover_____Bushing_____
Cover Fastener_____Cover Bolts_____
Thread in frame for fastening cover_____
Lower Support_____Upper Support_____
Repairs required on frame housing_____
Remarks:_____

Above inspection made by_____

Fig. 1—Check lists vary from brief to elaborate forms.

Fig. 2—Improper preparation for shipment can result in serious damage to equipment.

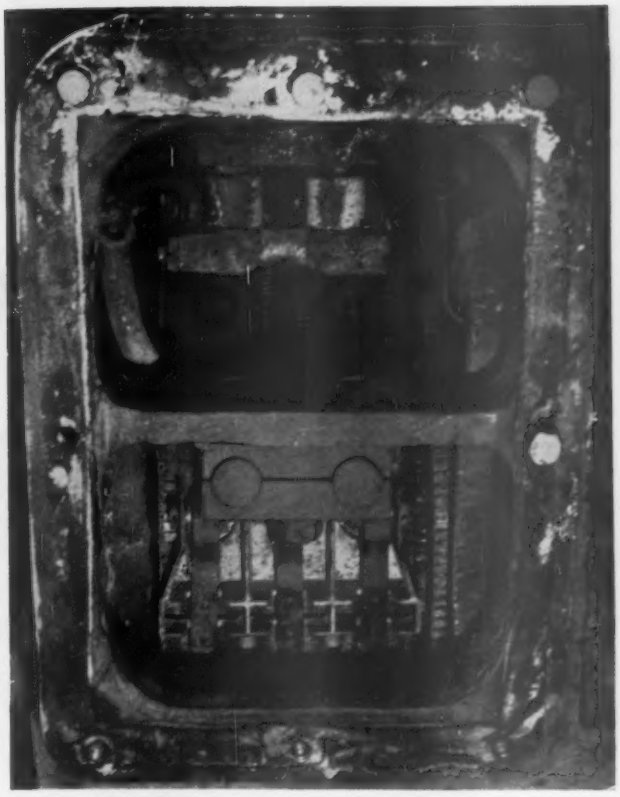


Fig. 3 (at right)—Flashed traction motor, showing dirty and roughened commutator surface, also dirty string band and brushholder insulators.

You're the Doctor

A doctor is experienced in reading the symptoms, diagnosing the case and prescribing for the patient. By close observation and a few simple tests you can determine the class of repairs required for the machines received at your shop. Using a check-off system, you can in a few minutes make a preliminary examination and enter important information on the patient's record. This will enable you to decide whether you have a routine case or one that requires surgery and a longer stay in the hospital.

Now is the time to start your records. Generally they will begin with a check list. This may be more or less detailed, as shown by the examples in Fig. 1. It should cover the items to be examined in the preliminary inspection. Don't trust your memory to get them all. Check off each item, signing or initialing as required. Each shop has its own record system. Some have been developed to a high degree, others are extremely brief. In any case, you will want enough information about the condition of the machine to permit work orders to be properly made out. In an accident case this information can be doubly valuable. It can help you to answer questions, such as "Whose fault was it?" "How did it happen?" "How serious was the damage?"

Start with the nameplate. This will give you the machine type and the frame number of some types. On others you will find the frame serial number stamped on the frame near the nameplate. You will also want the serial number of the armature, which is stamped on the end of the shaft. In addition to the initial machine record, some shops keep separate armature and frame records. The reason for this is that these components are often interchanged during overhaul.

Mechanical Checks

The first series of checks you will make are of a mechanical nature. They are mainly concerned with things you can see and feel. Through them you get an idea of the physical condition of the machine externally. It is a good idea to have a flashlight, a light inspector's hammer, a pocket scale and a set of feeler gages. Now you are ready to start your inspection.

For example, check the axle caps on a traction motor. Are they tight on the rabbett fits? Can you enter a feeler gage? Are they so badly worn that you can enter your pocket scale? Note the serial numbers stamped on them and compare with the serial number of the motor frame. You may find that the caps belong to another frame and have been incorrectly assembled on your frame. If this is the case, you will probably find that they do not properly fit the frame they are now on. This means they will not clamp the linings with the proper degree of tightness. Perhaps the linings were so tight that the bearings ran hot! If you suspect this, check for further evidence of heating by appearance and smell. Also, inspect the wick lubricators to see if they have been damaged. Make a positive note that micrometer measurements be made of the axle bores before removal of the axle caps. Information of this sort should be relayed back to the people responsible for changing out the motors and axles.

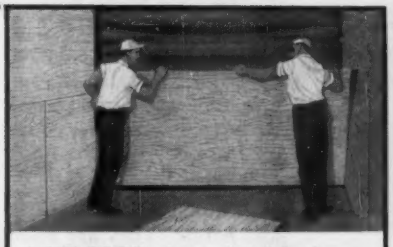
Look for clues to possible mishandling of the equipment and comment on them in the check sheet. Flat spots spaced at 90-degree intervals around the commutator indicate that power was held on the motor with the locomotive at standstill. An unusual amount of dirt inside a machine may point to poor filter maintenance. Thrown solder is a sign of overheating, possibly caused by defective blowers. Worn pinion teeth may be the result of inadequate gear lubrication. A note about this may prove valuable if inspection of the pinion end bearing after disassembly shows the grease to be melted out, and the bearing worn and near failure. Although these two facts might seem unrelated, they are actually cause and effect. Heat developed by the unlubricated gearing has carried through the shaft to the bearing, overheating it.

You may also find damage as a direct result of improper

(*Continued on page 54*)

Fir Plywood modernize

Only Exterior Fir Plywood car lining has all these advantages:

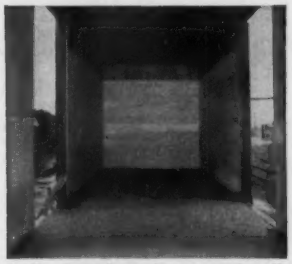


LOW COST—Easy to install fir plywood lining speeds work . . . saves 50 per cent and more in labor costs alone.

helps S. P. boxcars fast!

Labor time averages 8 to 10 hours per car, including preliminary framing, relining, cement coating floor.

Air operated stapling guns fasten plywood securely over old lining. Idea is new, works well, S.P. reports.



Re-lined cars have clean, smooth walls that can't snag fragile ladings such as bagged sugar or flour.

New method of stapling fir plywood over damaged lumber lining permits Southern Pacific to upgrade B and C cars to Class A carriers in only one-third the time and half the cost.

SOUTHERN PACIFIC has opened the throttle on one of the biggest car modernizing programs in its history. Work on over 400 cars is proceeding at a good clip and at remarkably low cost at the line's big West Oakland and Roseville (California) yards.

Credit for the outstanding speed and economy with which the job is being done is credited to a new technique; stapling big sheets of Exterior plywood over the old lumber lining.

The method takes only about one-third the time normally required for relining a car with T&G lumber—and cuts total costs just about in half. A big factor in the savings is that the old lining does not have to be torn out, as would have been the case in a lumber re-lining job.

The job is done by a two-man crew who tack panels in place horizontally so that two 4-foot wide sheets make up the required eight foot height. Since most cars are a bit over 17 feet from door frame to end, one 8-foot and one 10-foot long panel cover each course. Vertical joints are staggered. Then two more men follow up for finish stapling, shooting fastenings every six inches around panel edges and over vertical posts spaced 20 inches apart.

One of the chief advantages of the plywood-stapling method is that cars are out of service for a very short time. Beyond that, it's the best and most economical way of doing the job. But the payoff is in the more valuable ladings which can be carried in a Class A car, and it is often enough to pay off the entire upgrading cost in a single long run.

FOR MORE INFORMATION *write (USA only) for free "Plywood Industrial Uses Portfolio." Douglas Fir Plywood Association, Dept. 194, Tacoma 2, Washington.*

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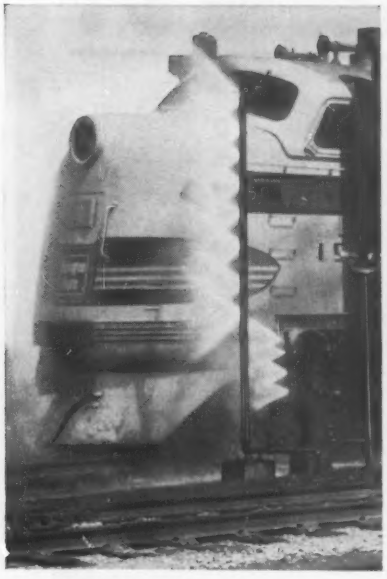
SMOOTH—Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.

WATERPROOF—Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

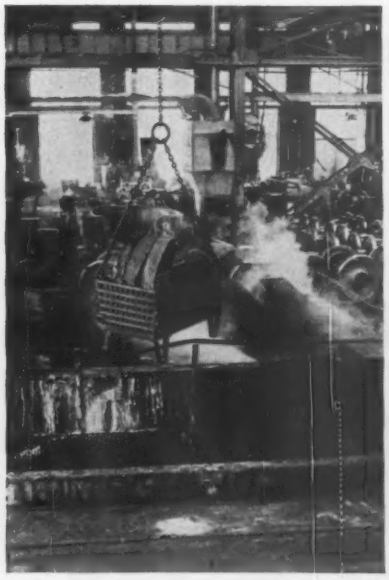
HERE ARE WYANDOTTE CLEANING



About 15¢ per unit for exterior diesel cleaning (machine washing). With an automatic washer and using WYANDOTTE-75, your diesels will be sparkling clean in just 1½ minutes per unit.

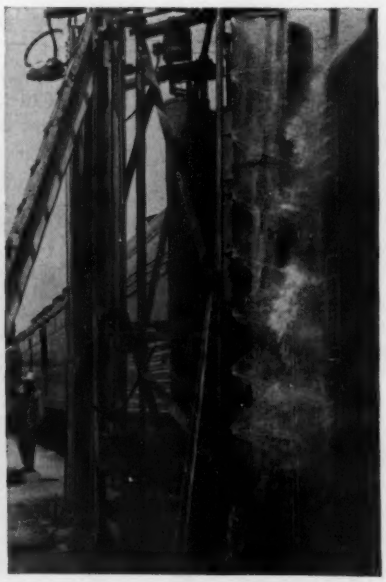
Only $1.35 per passenger diesel unit interior, using WYANDOTTE-30. No back-breaking labor. No costly hand wiping with Wyandotte spray-on, spray-off method. Units are sparkling clean, oil-free.

For less than $7, and in less than 8 minutes, WYANDOTTE-21 strips all paint from a boxcar. This cost includes stripper, labor, phosphatizing, and *all* other costs. Stripping tunnel is used; no hand labor.



Just 2½¢ to vat-clean a ton of ferrous parts with WYANDOTTE-11. This cleaner has good emulsifying characteristics, long service life, 100% solubility in water, controlled uniform quality, and low use-cost.

Only 3¢ to vat-clean a ton of aluminum parts with WYANDOTTE ALTREX.® You'll get a better cleaning job, and a faster one, with ALTREX. Compare this cost with that of any other cleaner on the market.



Just 13½¢ and one minute clean exterior of a passenger car (machine washing). Using WYANDOTTE-85, your cars stay bright and clean without paint damage. WYANDOTTE-85 is well inhibited, too!

COSTS--WHAT ARE YOURS?

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The true measures of an efficient cleaning operation are actual results and unit-cleaning costs—not the price-per-pound of the cleaning product.

Because cleaning is our business, and because of long experience in the railroad field, we have developed cleaning products designed to give you better results—save you *time and labor*, and do a better job.

Equally important, Wyandotte cleaning methods assure you of the maximum from your maintenance personnel and equipment, and positively establish a more efficient operation for you at use-costs equal to or less than those shown.

Dealing with Wyandotte brings you benefits—in both effective products and helpful services—that could only come from the resources, research, and know-how of the largest supplier of specialized cleaning and washing products for business and industry.

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Your Wyandotte cleaning specialist is assigned permanently to your line. He devotes his time to improving your cleaning in any local area or on a systemwide basis. Thus, he coordinates his activities with the requirements of your mechanical, purchasing, and test departments.

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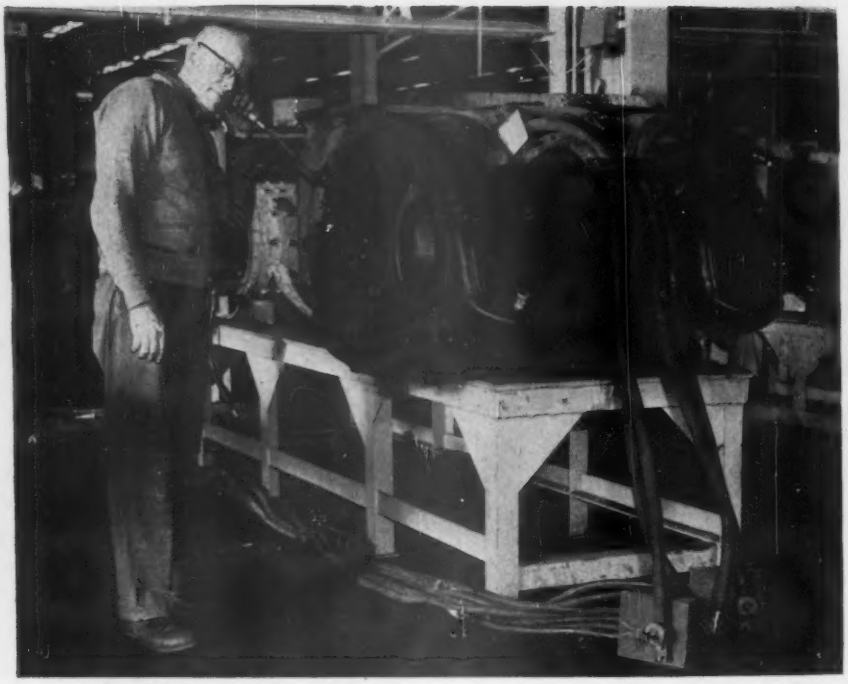

Fig. 4—Traction motor bearings can be given a quick check by listening to them while the motor is running light.

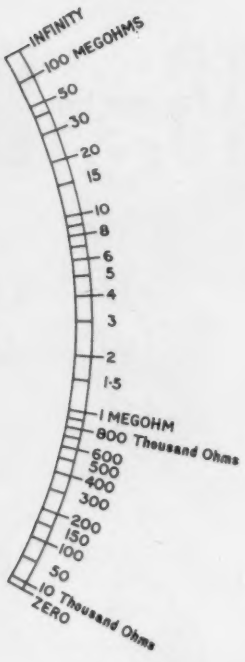

Fig. 5—Scale used on one form of insulation resistance tester.

skidding or shifting of the load in transit to the shop. An example of this is the generator shown in Fig. 3. Look at the mess! The light cargo strapping used to fasten it to the skids has burst, allowing the machine to tumble over on its end.

So far you have obtained important information for your records by means of a simple external inspection. The next step is to look inside the machine. Carefully remove the protective covers, and inspect the commutator and brush holders. Note anything unusual, such as overheating, throwing of solder, melting of brush holders or other evidence of flashover damage. This will include burning or smoking of the commutator string band and other important insulation creepage surfaces (Fig. 3). Look for lifted leads or "rat holes" behind the commutator risers. To do this you will need help to turn the armature over slowly so you can check thoroughly all around the commutator.

Your inspector's hammer will enable you to check tightness of polepiece bolts, framehead and bearing cap bolts, and wear plates. Or, you may use it inside if you suspect looseness of parts, such as brush-holder bolts. You may decide to postpone the inspection of outside bolts until the machine has been cleaned. This is wise if there is a heavy buildup of "cruddy" dirt, such as you often find at the pinion end of a traction motor when gear compound has been leaking badly.

Electrical Checks

Looking and smelling will tell you something about the condition of the electric windings and insulated parts of the machine. However, you will have to test the electric insulation to answer the all-important question—is it good or bad? The tool for this insulation test is the portable megohmmeter. It indicates insulation resistance values directly on a numerical scale. One commonly used type has a scale as illustrated in Fig. 5. As you can see, the scale divisions are not equal. For instance, a resistance of one megohm occupies nearly a third of the scale at the zero end. Near the infinity end of the scale the same value of resistance occupies only a few hundredths of an inch. Remember this when you are using such a meter. Standard testers are available in a wide range of voltages. The 500 and 1000-volt sizes are the most common on railroad properties.

The insulation tester is no "magic box." Values it indicates will vary, depending on length of time for the test, instrument voltage, temperature of the winding, humidity, etc. Your job is to analyze the readings in the proper light. In general, the backshop is interested only in measurements taken at room temperature, and you will seldom need to interpret hot machine readings. Curves are available in manufacturers' instruction books so that, if necessary, you can correct readings for temperature. By doing this all readings can be put on a comparative basis. They then will serve as an indication of the insulation condition—whether it is clean or dirty; wet or dry; good or bad.

Know What Good Insulation Should Look Like

When making measurements it is also most important to note the appearance of the insulation. Write down your opinion of the appearance of the important creepage surfaces along with the insulation resistance readings. Also, note whether the machine is wet or dry. Watch out for moisture in machines that have been exposed to rain or snow during shipment; or stored in a damp place for some time; or brought out of the cold into a warm shop. Moist creepage surfaces will act like dirty ones and lower the insulation resistance reading. Partly dirty surfaces are specially susceptible to this. You will want to wait for the insulation to dry off before measuring its resistance. The drying can be hastened by blowing warm air on the machine or by baking it in an oven.

By a short series of readings with your tester you can localize electric insulation trouble if it exists. Suppose, for instance, that a motor comes in tagged "grounded." Naturally, you will want to confirm this. If it is true the defective part will have to be repaired. But experience has probably taught you that many such reports have turned out to be false

(*continued on page 56*)

More Ex-Cell-O pins and bushings than any other kind will pass this signal

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57-27

Fig. 6—Commutator surface can be checked accurately by means of a dial indicator mounted as shown.

alarms. Perhaps all that is needed is to clean the string band! Your insulation tester will help locate the "ground" in one of the field winding circuits, the armature, or the brush holders.

You can use the strategy of "divide and conquer" in checking out this motor. By connecting the tester to the main field leads coming out of the frame you can measure the insulation resistance of the existing field winding. Connecting to the armature leads gives you the insulation resistance of the armature and commutating field in series. Suppose the ground shows up in the *A—AA* circuit. If you have access to the brushes you can lift them off the commutator, thus breaking the circuit into two parts. Now you can measure the armature and commutating field separately. It is impractical to try to pinpoint the individual faulty field coil until the machine has been disassembled.

When reading your tester, be specially careful to note the exact needle deflection if it is near zero. Don't record "zero ground" or "zero megger" if the needle reads upscale as little as a sixteenth of an inch! As long as there is life in the insulation there is hope that it may be restored. Give the patient the benefit of the doubt. He may be almost gone, but there is still a chance that you can bring him around. If you suspect that moisture is causing the low readings, you may want to dry the machine more and try again. If the insulation is dirty, brushing the creepage surfaces may increase the readings considerably. On the other hand, you may decide to go ahead with routine teardown and wait until after cleaning and drying out before taking another insulation resistance reading.

Other Tests before Disassembly

The routine of some shops calls for a high potential test to follow the insulation resistance test before the machine is disassembled. Unless proper precautions are observed, high potential testing can be dangerous to both personnel and machines. Most shops have definite rules about such testing, and locate the equipment in a restricted area under the supervision of a qualified tester. They also require a certain minimum insulation resistance reading of a safe value before permitting the high potential test to be applied. Be sure never to put overpotential on a machine whose insulation resistance is below the safe limit. You can obtain values of this limit for various machines from the manufacturers' instruction books and recommendations of the AAR.

Like the routine test run, which is standard practice for running maintenance, incoming machines may occasionally be run light. By so doing you can confirm suspicions you may have regarding previous abuse in service. You can also get a more accurate measure of the "as received" condition of the machine. At this time you can check the commutator by feel, listen to the bearings, (Fig. 4), and check the general rotating balance. Applying voltage will also show whether the machine is operative electrically, or whether it sends out a shower of sparks from the brushes.

Don't Make Unnecessary Tests

In making your decision regarding the running test, you will have to balance the advantages against the added time and cost. The value of this check will depend somewhat on whether the machine is to be disassembled and have its parts completely checked before reassembly. When this is done, some of the checks made when running light will be duplicated when the parts are checked later.

An accurate way to measure the eccentricity of the commutator is to mount a dial indicator as shown in Fig. 6, and turn the armature by hand. The total indicator deflection is a measure of the commutator runout. Sudden swings of the needle will indicate surface irregularities, such as flat spots or high bars. If you find flat spots spaced 90 degrees apart on the commutator of a traction motor, you have evidence that the engineman was at fault.

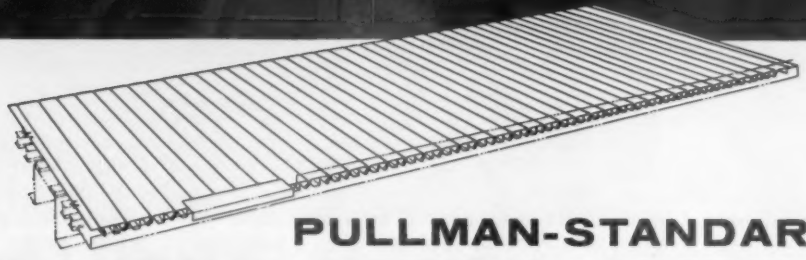
Any generator can be run light as a motor for testing, provided separate excitation is furnished for the field. This test is more difficult in the case of a single-bearing main generator since it requires using a special adapter with an outboard bearing. Standard practice on most railroads is to test main generators under load while mounted on the engine. Two-bearing auxiliary machines may easily be run light if desired.

What's the Use?

The few simple tests and observations before disassembly that have been described in this article are most valuable. As you have filled out the various items on the check list, you have accumulated the same kind of information as a doctor has in the case history of a patient. When the machine is torn down and inspected, these records can save you time and money. They will tell you where to look for trouble, and help you decide whether parts should be used, reworked or scrapped.

Not only does the backshop benefit by these records, they are also valuable for running maintenance and operating crews. Conditions caused by abuse or neglect will come to light when the machine is torn down in the backshop. This fact is a sort of check that helps keep the men out on the road on their toes. As a result of what he finds, the backshop man can often suggest improvements in running maintenance routines that will improve performance and reduce expense.

There are many opportunities for backshop and running maintenance people to be mutually helpful. As cooperation of this sort is developed between the two groups they will become a smooth running, efficient team. The results will show on the score board as reduced maintenance expense and improved locomotive performance.



PULLMAN-STANDARD

NAILABLE STEEL FLOOR

provides 33% more nailing space... plus exceptional nail holding power

Cost and service conscious railroads all over the Great American Railway System are replacing wood decking with long-lasting, easily installed Pullman-Standard Nailable Steel Floor. Prominent carriers have over 2500 car sets of this outstanding lading and equipment protection product now in service or on order with Pullman-Standard.

Behind these users' decisions to specify Pullman-Standard Nailable Steel Floors is the knowledge that they are built to provide exceptional durability and strength plus superior nailholding power. And floor maintenance is minimized . . . cars stay in service longer. Costly floor repairs and cooperage are practically eliminated.

The P-S Nailable Steel Floor design includes ample nailing space, contributing to lading security for your shippers. 99 car-width grooves in a 50′-6″ box car and 79 in a 40′-6″ box car means 33% more nailing space than other steel floors. Permits any conventional arrangement of car bracing, blocking or bulk-heading.

For complete details on this exceptional lading protection and car maintenance-reducing product by Pullman-Standard, write for literature or contact your nearest P-S sales office.

- P-S design provides exceptional nail holding power with any size nail from 16d to 40d.
- Steel angle supports and plank joints provide floor support every three inches . . . help prevent crushing and dishing by heavy lift trucks and racks.
- P-S narrower planks on 6″ centers provide greater strength and more nailing grooves.
- P-S flexible nailing joint snaps back . . . retains original holding power even after use of 30d or 40d nails.
- 1/16″ underframe clearance built into plank joints prevents offsetting . . . planks are always level.

WORLD'S LARGEST BUILDER OF ROLLING STOCK

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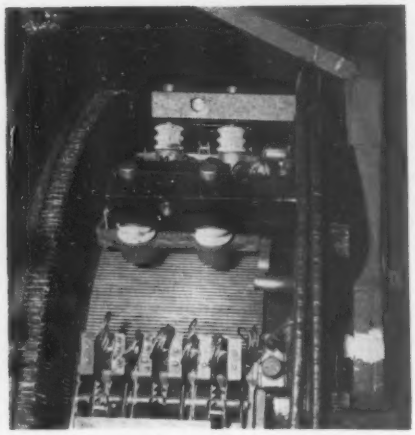
BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

HOW MUCH DO YOU KNOW ABOUT BRUSHES?

How Should a Brush Test Be Handled?



THERE ARE TWO TYPES of brush tests. One may originate from dissatisfaction with the performance of the present grade in use, or on the premise that a different grade will give better performance. The second type of test represents the introduction of a new grade by some brush manufacturer. Normally, with the first type of test, the following items of information are the least that is necessary.

1. Choose commutators that are in Class A condition, using the standard accepted rating method.

2. Rubber stone previous brush grade's film off of commutator.

This is the eleventh of a series of questions and answers which are appearing each month.

3. Install test brushes, measuring length of 6 o'clock stud brushes on motors and in 10 o'clock stud on generators. Never assume standard length of brushes, especially on a competitive test. On generators true life reading will be high if the width of the toe of the beveled end is increased from the standard width. Make all measurements with a caliper in 1/64 in.

4. A responsible representative of the railroad should always be present to observe the collection of installation or inspection data.

5. Record unit number, generator or motor serial number, truck number if testing on motors, unit mileage, motor or generator mileage, and commutator classification.

6. Mark or tag all motors or generators involved in a test.

7. Never run a brush test without a control test of the standard brushes on alternate motors of a given unit, or on the opposite generator if on a passenger unit with two generators.

8. In a competitive test, no one representative should be permitted to inspect the tests without a responsible railroad representative present.

9. Agree on at least a tentative data for follow-up on the test at the time of installation.

10. Record the same data as above on subsequent inspections plus measuring brushes to calculate life per ⅛ in. and rating the commutator classification.

11. If possible, photographs should be made in color of the commutators when brushes are installed and on subsequent inspections.

12. Unauthorized tests can be costly in the form of damaged motors or generators.

13. Tests should include a minimum of eight test motors and eight control motors; for generators a minimum of three each should be used. A test on one or two motors is usually made worthless because of operating variables and the fact that motors vary from motor to motor in commutating characteristics. (This is why a blackband test is so important in establishing the range of commutation tolerance of a brush grade.)

The second type of test requires definite knowledge of the commutating ability of the brush grade to be tested. Railroads can save time and money by eliminating indiscriminate testing of brush grades which have not been screened by a blackband test for commutation on the particular electrical machine involved. Most reliable brush manufacturers have a cooperative arrangement with the locomotive builders to complete this preliminary step before submitting a brush grade to the railroad for testing.

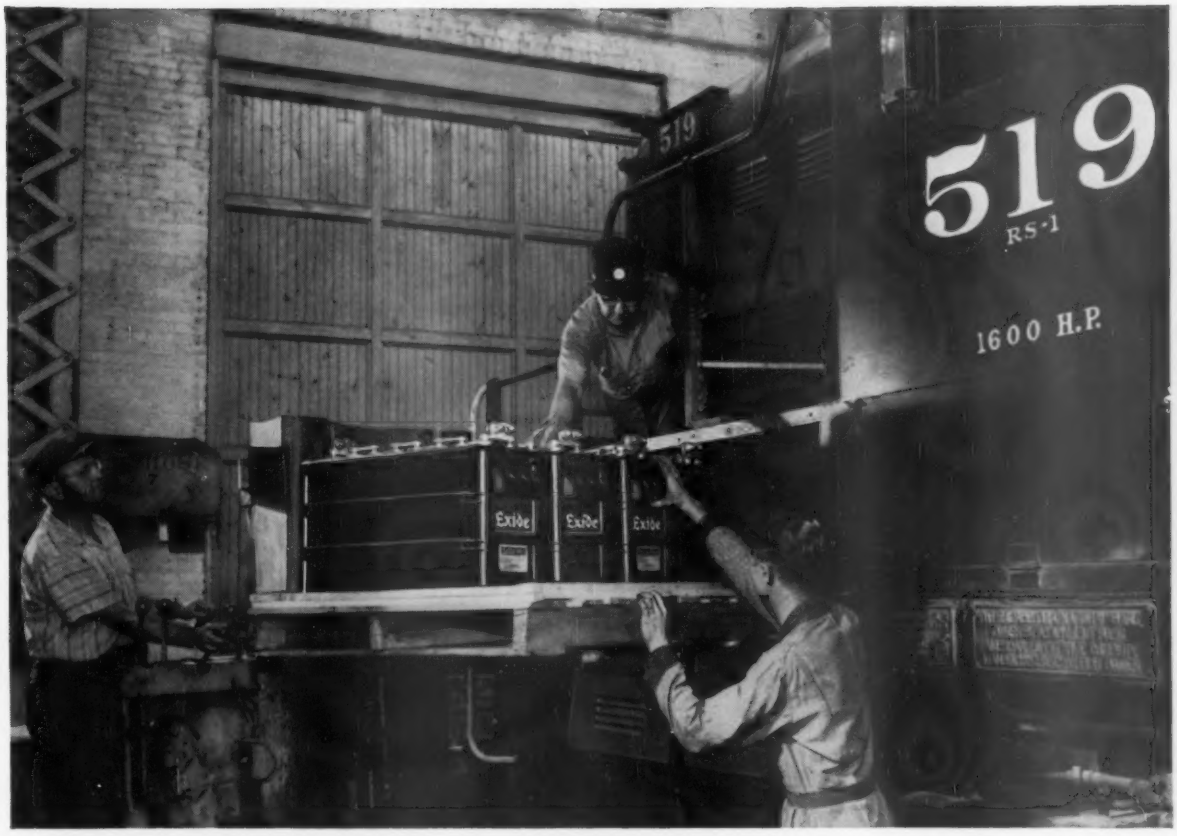
When permission has been given to install a test the same information previously outlined must be collected.

By K. R. MATZ
National Carbon Company

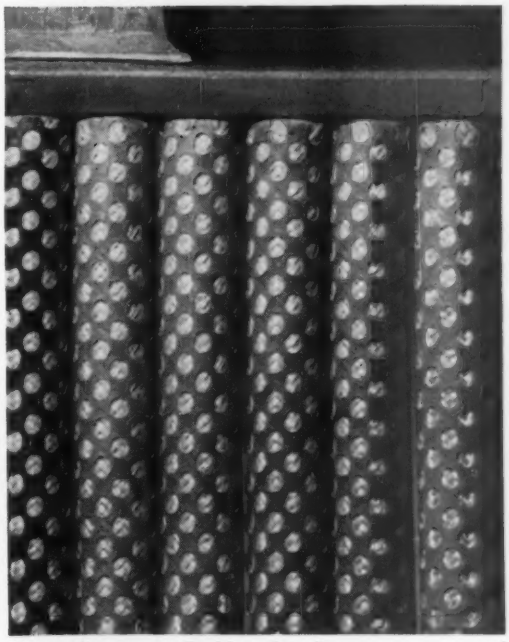
Here's Progress in Clearing Carbon Grounds

L. M. LEGG, electrical engineer of the C&NW, developed a machine in 1952 for the primary purpose of clearing up grounds in windings of a diesel locomotive main generator so the locomotive could continue in service until the next general repairs. Used experimentally for over a year, it successfully cleared up grounds in five of seven main generators and one of three traction motors caused by carbon (See Railway Locomotives and Cars, March 1953, pages 96-97). The machine will not clear up moisture grounds, solid metallic grounds, or repair damaged insulation.

Known as the Elco process, the machine now has been simplified, and the North Western to date has cleared grounds and returned to service 27 locomotives out of 35 attempted. In each of these cases, the process was not used until after all other known methods for clearing grounds had failed, and the generator scheduled for removal, an expensive undertaking. Its use is simple. The affected piece of apparatus is isolated electrically from all other circuits. The portable Elco machine, weighing 37 lb, is attached and operated by a qualified electrician. A "hashed" current (without form or pattern) of very small value is caused to flow through the carbon crust which causes disintegration by transforming a portion of it to gas. If the ground is caused by carbon, it should begin to clear before the machine has been in use one hour. The North Western has found it not uncommon to clear a main generator from a zero resistance reading to infinity in five minutes.



MAKE YOUR MONEY GO FARTHER



Here's the secret. Positive plate features new armored porous tubing developed out of 15 years' research. Prevents shedding. Improves access of electrolyte. Stretches battery life. New MGD can crank longer and recuperate faster.

New MGD Exide-Ironclad Diesel Locomotive Battery gives you better battery performance, yet costs you less to own and operate

Some things cost you more today. But the new MGD Exide-Ironclad Diesel Locomotive Battery actually gives you more battery for your dollar—and costs you less to own.

In designing the MGD, Exide engineers found the way to unlock more power from battery materials. This new design makes the MGD a more efficient battery—hence a more economical one. What's more, its superior performance characteristics and longer life potential stretch your battery budget even further.

Only Exide could have given you this battery. Because only Exide has the tubular plate construction that makes these advances possible. Write for complete illustrated bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

Rain or Shine suits C

WEATHER WAS IDEAL for the recent performance trials on a 74-mile taconite plant railroad in northern Minnesota—it rained and rained for four of the six days and everybody and everything got running wet—including the Cobra Shoes.

But it didn't matter as far as Cobra Shoe performance was concerned. Stop distances from day to day varied only 30 to 40 feet—wet or dry. There was no apparent difference—stops shorter and longer than the median were just about equally proportioned between wet and dry. Write for complete information about Cobra Shoes.

Cobra Shoe performance is not affected by moisture

Product of the combined research facilities of . . .

Westinghouse Air Brake Company
Specialists in Braking

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Specialists in Friction Materials

RAILROAD FRICTION PRODUCTS C

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COBRA® SHOE TEST

TEST TRAIN CONSIST—5-unit locomotive, 3 cabooses, 97 cars. Gross 12,960 tons—Empty 3,865 tons.
TEST PROCEDURE—(1) Service stops (2) Emergency stops (3) Running release after slowdown (4) Operation down seven miles of 2% grade.
OBSERVERS—55 individuals from 30 railroads including vice presidents of operations, general managers, superintendents of transportation, air brake supervisors.

® *Registered U. S. Trademark, Composition Brake Shoe*

S CORPORATION, *Wilmerding, Pennsylvania*

What's New

(*Continued from page 18*)

Milling Machine Manufacturer's standard spindle nose are retained. This spindle nose accommodates a complete new line of No. 50 series standard flanged arbors and adapters. These arbors can also be used on older machines without the Arbor-Loc feature. Special purpose quickchange accessories are not required.

The four-piece Arbor-Loc can be dismantled within a minute's time when desired to mount face milling cutters on the spindle nose. *Cincinnati Milling Machine Company, Dept. RLC, Cincinnati 9.*

Acetylene Generator Has Automatic Signal System

The Oxweld MP-11 acetylene generator has a newly developed automatic signal system. With a carbide capacity of 500 lb, the MP-11 will produce 1,000 cu ft of medium-pressure acetylene per hour. Delivery rates of up to 2,000 cu ft of acetylene per hour are obtainable over short intermittent operating periods.

The automatic signal system consists of a howler and indicator lights that provide both audible and visual warning if carbide supply, water level, or water temperature should deviate from normal. With standard regulating equipment, the MP-11 generator can be used to supply low-pressure acetylene to a piping system. Continuous operation reduces the number of generators needed in multiple generator installations. *Linde Company, Division of Union Carbide Corporation, Dept. RLC, 30 East 42nd st., New York 17.*

(*Continued on page 66*)

Diesel Days

By Gordon Taylor

SHORTLY AFTER a GP-7 unit had a new 18-kw unit-exchange auxiliary generator applied, it was noticed that the headlight lamps were burning out rather often. This naturally called for a check of the voltage regulator.

It was then discovered that the voltage was rather irregular, but not excessively high when the engine was operating in throttle positions, Nos. 1 to 7, inclusive. However, in throttle position No. 8, the voltage would go wild and rise to approximately 90 volts. The voltage regulator seemed to be operating properly, but it simply could not cut in enough resistance to weaken the field to bring the voltage down to 74 or 75 volts.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

A careful check was made of the generator. It seemed to be in good condition. Its windings tested okay, and all wiring connections between the generator and regulator checked okay. The brush holders were set at the mark originally fixed by the builders, and the commutator showed no signs of sparking at the brushes.

A careful check was made of the voltage regulator. It was all right, except for the fact that it simply lacked range of capacity to control the voltage when the engine was in throttle No. 8. It could hold the voltage near 75 volts in throttle No. 7, but it lost control when the engine speed increased to throttle No. 8.

There was a locomotive standing on the next track, so the following test was made: The voltage regulator on the unit in trouble was disconnected from its generator and connected up with the generator on the neighboring unit. It controlled the neighboring generator correctly.

The voltage regulator on the neighboring unit was connected to the generator on the unit in trouble, and it too failed to control the voltage of the auxiliary generator when operating at throttle No. 8 speed.

A spare auxiliary generator was applied to the unit in trouble and everything was right. The voltage regulator controlled the voltage of the spare generator at all engine speeds.

The trouble was clearly in the first generator, but what was wrong? A close comparison of the two generators showed a difference in brush holder location.

On the generator in trouble, the brush holders were found shifted back *against* the direction of rotation the width of two commutator bars. With brushes in that position, the voltage was erratic, but it stayed reasonably close to 74-75 volts at throttle positions lower than throttle No. 8. When the speed was stepped up to throttle No. 8, the voltage would rise to approximately 90 volts, despite the best efforts of the voltage regulator.

The brush holders on the troublesome generators were shifted *forward* in the direction of rotation the width of two commutator bars. That corrected the trouble.

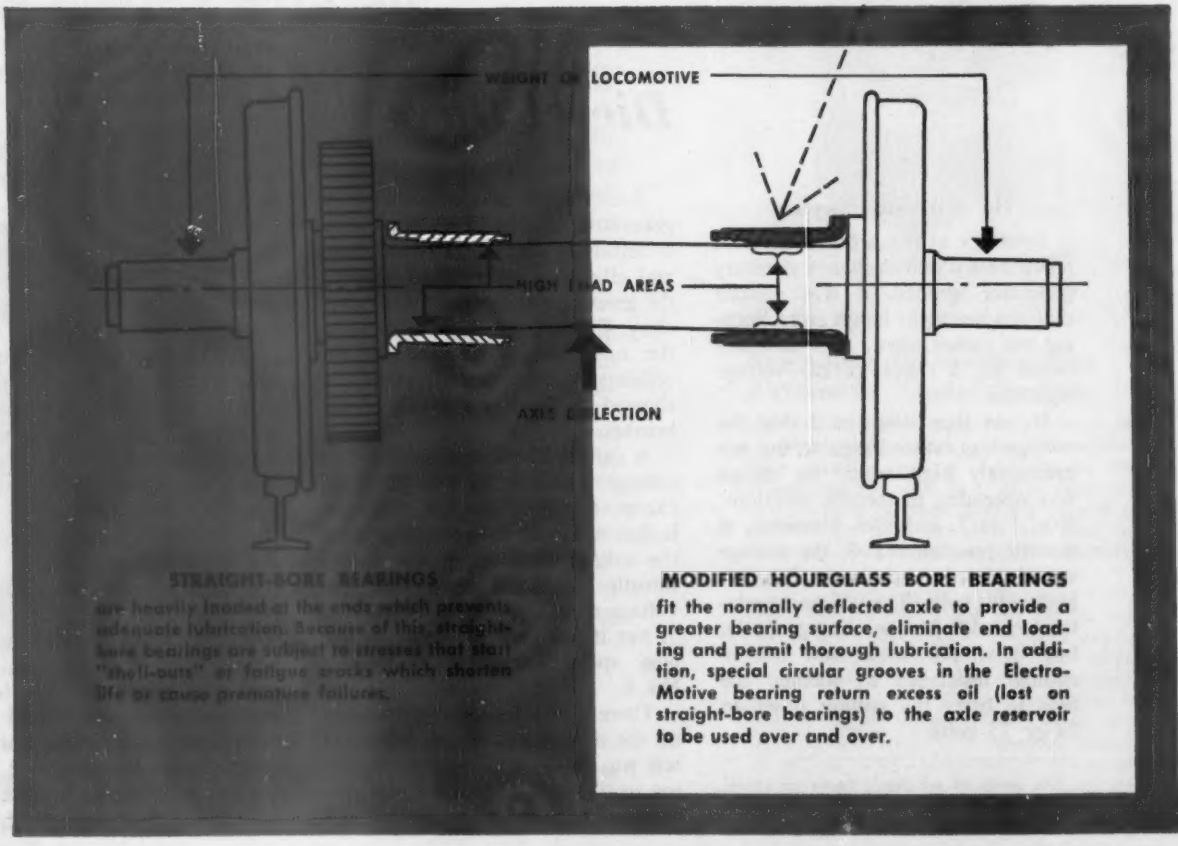
The confusing thing about this case was the fact that the generator in trouble had recently been tested by the manufacturers, and the brush holder position was not suspected. The fact that commutation was sparkless also seemed to confirm that nothing could be wrong with the brush holder position.

Further investigation revealed that two generators had been received from the manufacturer with improper brush holder settings. In one case, the generator was found to have no marks that would indicate the proper brush holder position. In another case, the generator had two sets of punch marks, but the brushes were set at the wrong mark.

Now, from ELECTRO-MOTIVE—

1 TRACTION MOTOR SUPPORT BEARINGS WITH EXTRA LIFE, HOURGLASS DESIGN

Electro-Motive modified hourglass bore design compensates for axle deflection to eliminate end-loading and provide better lubrication. Result: A longer service life than straight-bore bearings.



STRAIGHT-BORE BEARINGS
are heavily loaded at the ends which prevents adequate lubrication. Because of this, straight-bore bearings are subject to stresses that start "shell-outs" or fatigue cracks which shorten life or cause premature failures.

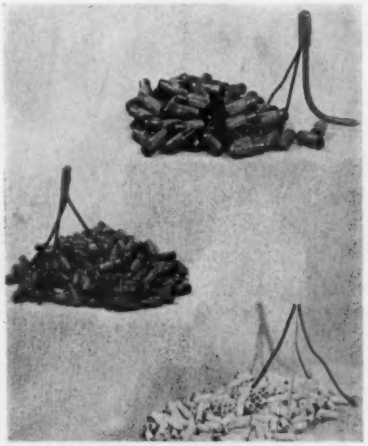
MODIFIED HOURGLASS BORE BEARINGS
fit the normally deflected axle to provide a greater bearing surface, eliminate end loading and permit thorough lubrication. In addition, special circular grooves in the Electro-Motive bearing return excess oil (lost on straight-bore bearings) to the axle reservoir to be used over and over.

(*Continued from page 62*)

Air-Powered Screw Drivers, Nut Setters

This series of air-operated screw drivers and nut setters are powered by the Keller Tool No 2 air motor. The 12A-2 series screw drivers and 16A-2 series nut setters have a complete speed and torque range from high speed, low torque to high torque, low speed.

The tools feature interchangeable gears, spindles and chucks which afford quick conversion to various jobs, side-air intake and large exhaust ports, one-shot lubrication with flush-type fitting, capacities up to 5/16 in. Straight-drive, positive and cushion clutches, with holders for 1/4 and 7/16 in. hex socket drives are available. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*



Spring Wire Connectors

Two new color-coded, pre-insulated spring type wire connectors have been added to the 3M line of Scotchlok brand electrical connectors making more than 400 wire combinations using only three connector sizes.

The Type Y (yellow) connector will

(*Continued on page 68*)

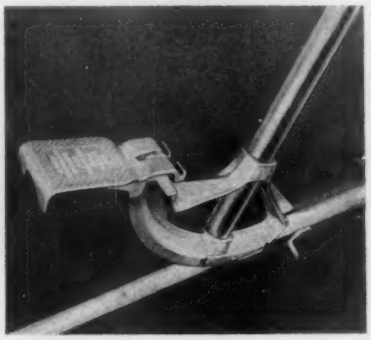
What's New

(*Continued from page 66*)

splice solid or stranded wires from No. 12 through No. 18; the Type R (red) No. 10 through No. 16; and the Type B (blue) No. 6 through No. 12. The connectors consist of a cone-shaped coil spring within a steel shell to prevent crushing in crowded junction boxes. The vinyl insulating jacket—molded over the unit—features a triangular cross-section for a better finger grip during application. It also includes a skirt at the bottom to protect the wires and prevent flashover.

In use, the connectors are simply twisted on the ends of the wires to be spliced—the cone-shaped spring construction providing threads and gripping the wires firmly under constant, live spring action.

Minnesota Mining & Manufacturing Co., Dept RLC, 900 Bush st., St. Paul 6, Minn.



Foot Booster Pipe Bender

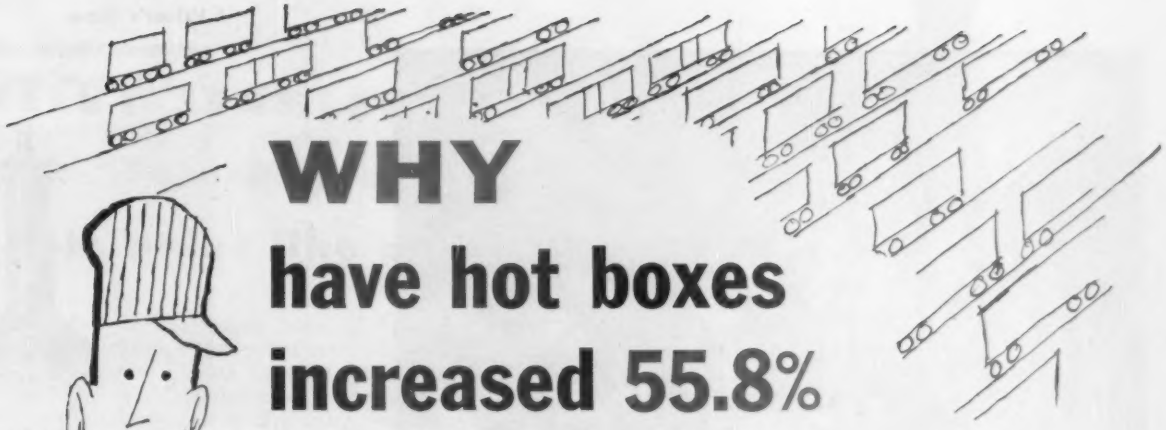
An addition to the Powr Jack line of conduit benders bends ¾-in. Sherarduct and other types of rigid steel conduit, as well as one-in. Xduct Junior metallic tubing.

The tool utilizes a two-position foot treadle booster step which provides foot leverage to assure smooth, true radius bends. The PJ100 bender, of pearlitic malleable iron, is finished in aluminum paint, with bright red symbols for precision bending. For safety, the tool is pre-stressed at the factory to a pressure of 16 tons. *National Electric Products Corp., Dept. RLC, Pittsburgh.*

Portable Hand Lamps

This explosion-proof hand lamp, uses a 100-watt A-21 lamp, and is designed for rugged service. All exposed metal parts are made of non-sparking aluminum and the insulated handle is made of high impact-resistant plastic. The globe is

(*Continued on page 70*)



WHY have hot boxes increased 55.8% since 1954?

The A.A.R. figures are accurate and clear! A total of 142,245 hot boxes experienced in the first eight months of 1957 against only 91,277 in the like period of 1954! What's responsible? Lack of proper supervision? Lack of proper maintenance procedures? Poorly renovated thread Packing? Or the multitude of gadgets and pads introduced in those years?

The answer is probably a combination of all these factors. The fact remains, however, that in 1954, when journal boxes were packed with new and renovated thread Packing according to A.A.R. specs, there were almost *51,000 fewer hot boxes* than this year! Think of the savings, had this record been maintained!

There's an even more basic savings to consider. As an example:

2,000,000	Freight cars packed with substitutes such as pads, etc., not yet proved *in service*, @ an average price of about $40.00 per car set	**$ 80,000,000.**
2,000,000	Freight cars packed with approved A.A.R. Journal Box Packing @ approximately $4.90 per car set	**$ 9,800,000.**
	Savings	**$ 70,200,000.**

It all adds up to real economy when you stick to tried-and-true measures. In short, there is no economical replacement for A.A.R. Approved Journal Box Packing.

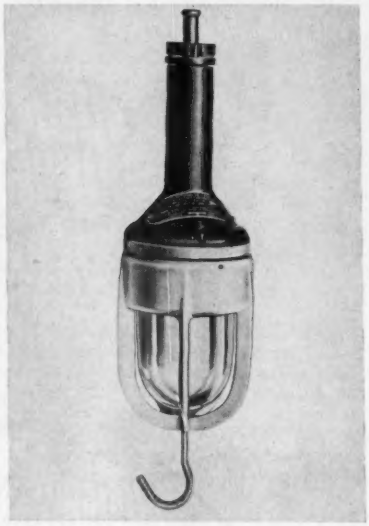
INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.
Meyer Burstein & Sons, Neenah, Wisconsin
Dallas Waste Mills, Dallas, Texas
The J. Milton Hagy Waste Works, Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
Miller Waste Mills, Inc., Winona, Minn.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
Riverside Mills, Augusta, Ga.
Royal Manufacturing Company, Perth Amboy, N. J.
Southland Manufacturing Co., Inc., Norfolk, Va.
Twin City Textile Mills Waste Co., St. Paul, Minn.

What's New

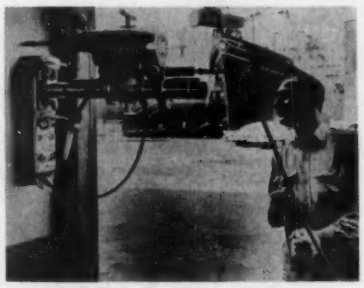
(*Continued from page 68*)



tempered glass which is heat and impact-resistant.

The threaded guard secures and seals the globe to the holder which is threaded to the insulated handle. For re-lamping, the metal assembly is removed as a unit. All threaded joints are locked to prevent accidental loosening.

Portable cord is installed or replaced by a 3-pole connector provided within the handle. One pole is used for ground. *Pyle-National Co., Dept RLC. Chicago, 51.*



Magnetic Drill Press

This 1¼ in. Magnetic drill press designed for continuous operation on either a-c or d-c, is said to drill holes within 1/64 in. accuracy and will not overheat, thereby reducing its magnetic hold. Features include a drill point locator for exact positioning, two piece construction for ease of handling, and a remote control hydraulic power feed which enables the operator to drill with little effort and to stand clear of the work.

(*Continued on page 72*)

SHELBY SEAMLESS TUBING

helps "Pole-Master"* handle poles like matchsticks

THE POWERFUL, two-legged boom of this "Pole-Master" Hydraulic Derrick is made of cold drawn tubes of USS Shelby Seamless Mechanical Tubing. Capable of handling poles up to 75 feet in length with relative ease, the boom is activated by two hydraulic cylinders, also of Shelby Seamless, which are powered by a heavy-duty hydraulic pump. The derrick has an operating arc of more than 180 degrees, and is designed to "set" poles or "pull" them from the ground. The "Pole-Master" can be used under the most severe work conditions in any weather or climate.

Here is an application in which Shelby Seamless Tubing really excels, for it brings into play all the desirable qualities that Shelby Seamless possesses—high strength, uniformity, shock absorbency, dimensional accuracy, lightness and workability.

Produced to exacting standards by the world's largest manufacturer of tubular steel products, Shelby Seamless is available in a wide range of diameters, wall thicknesses, various shapes and steel analyses. You are invited to call on our engineers for assistance. They will be happy to submit recommendations based on a study of your particular requirements.

*Manufacturer's name on request.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **SHELBY SEAMLESS MECHANICAL TUBING**

A PRODUCT OF NATIONAL TUBE

UNITED STATES STEEL

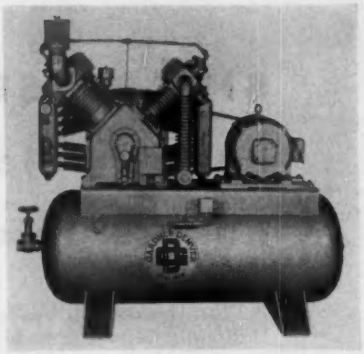
(*Continued from page 70*)

The magnetic base is detachable from the drilling unit to cut in half the weight that must be supported as the unit is secured in position. In attaching the base to the work surface, the drill point locator makes it possible to align immediately for accurate drilling. A built-in headlight throws a direct light beam at the center of the hole. Magnetic contact is controlled by a safety grip trigger switch on the base.

Remote control hydraulic power feed permits easy control when drilling overhead, in a sidewall, or in the center of a large area. Drilling capacity is 1¼ in. of steel, with tapping and reaming capacities of 1 in. in light steel and ¾ in. in heavy steel. Length of drill stroke is 15 in. Direct magnetic pull is 3,500 lb. *Black & Decker Manufacturing Co. Dept. RLC, Towson 4, Md.*

Air Compressor

The ADL-1000 extra capacity compressor, according to the manufacturer,



eliminates the need to buy a second compressor when only slightly larger air capacity is needed.

This two stage, air-cooled, 20-hp two-cylinder vertical compressor has a piston displacement of 100 cfm at 870 rpm in continuous service, and discharge pressure up to 150 psi. On intermittent service, it is suitable for discharge pressure as high as 250 psi. *Gardner-Denver Company, Dept. RLC, Quincy, Ill.*

Low-Cost Breaker Enclosure

A compact handle-through-cover enclosure for GE 2-pole and 3-pole plug-in Type TQL circuit breakers has been made available. With 240-volt a-c, 10- through 50-amp breakers, the enclosure can be used for individual or centralized control of equipment. It can be used as a main disconnect for remotely located branch circuit panels and to protect insulated conductors in feeder and branch circuits from overcurrent. It is furnished for either flush or surface mounting in a light grey.

It features insulated groundable neutrals, spacious wiring gutters, ample knockouts, provision for wire sealing covers and padlock locking. *Circuit Protective Dept. General Electric Company, Dept RLC, Plainville, Conn.*

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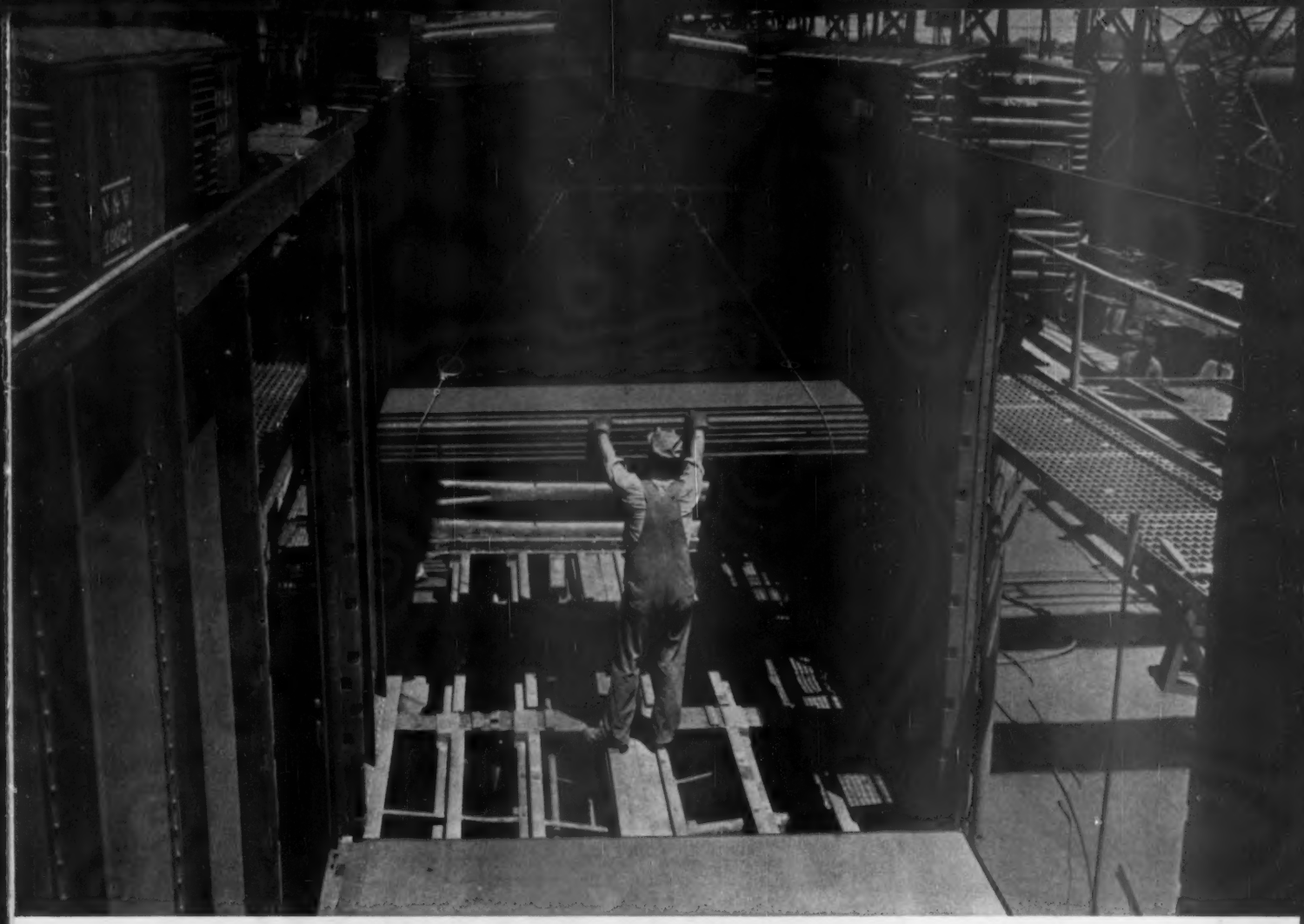

One of 50 freight cars receiving heavy repairs with N-S-F *at the Portsmouth, Ohio, shops of the Norfolk and Western.*

N-S-F® helps N&W PRECISION TRANSPORTATION PREPARE for the future

Economy-minded railroads are building longer life and better service into their repaired cars by using NAILABLE STEEL FLOORING. Years of service prove that N-S-F not only eliminates floor repair problems, but adds structural strength to the underframe, and lasts as long as the car itself. With N-S-F Class A cars are available to shippers for all ladings.

For complete performance and cost studies on the use of N-S-F in heavy repaired cars, contact our nearest representative in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis, Atlanta. In Canada, N-S-F is made and sold by International Equipment Co., Ltd., Montreal.

N & W heavy repaired boxcar with N-S-F *installed. Skidproof surface adds personnel safety.*

N-S-F is a registered trademark of Stran-Steel Corp.

NAILABLE STEEL FLOORING
Originated and sold by—
STRAN-STEEL CORPORATION
Dept. L-63 • Detroit 29, Michigan • Division of
NATIONAL STEEL CORPORATION

What's New

(*Continued from page 72*)

Electric Chain Hoist

This electric chain hoist is said to be adaptable for utilization on production lines, over machine tools, or in any shop location where space is at a premium. The device is available in two types of reeving—the 300-2000 lb, single chain unit and the 3000-4000 lb capacity, double-chain unit.

Operation has been arranged for one-hand control with clearly marked handles for up or down travel of its hook. Control ropes are attached to a control lever which activates a controller to raise or lower the hook and also act as the limit switch control. Double braking action provides built-in safety. The spring operated motor automatically and instantly locks when the control cord is released. A chain lubricator furnished with the device, lubricates the chain as it passes over the load wheel.

Motors for the unit are available for operation on standard voltages and frequencies: 115 volts, single phase, 60 cycles; 230 volts, single phase, 60 cycles; 220/440 volts; reconnectable three phase, 60 cycles; and 550 volts, tree phase, 60 cycles. *Wright Hoist Division, American Chain & Cable Co., Dept. RLC, York, Pa.*

Zippertubing For Harnesses

Zippertubing for wiring harnesses and for enclosing and protecting multiple

(*Continued on page 76*)

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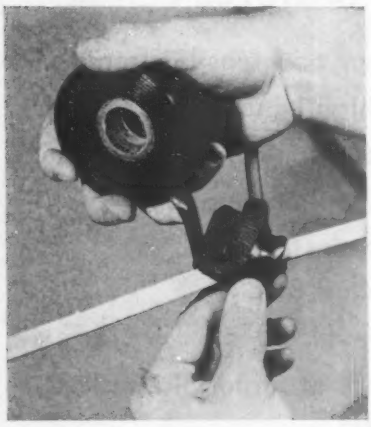
(*Continued from page 74*)

runs of wire consists of a plastic jacket with a zippy-type closure.

The zipper pull-tab may be unzipped and re-used where required or permanently sealed. When sealed, the seam will withstand a linear strength test of 45 psi. Sizes range from ⅜ in. in diameter and larger in increments of ⅛ in. The tubing is available in nine different colors and in continuous lengths from 20 to 1,000 ft. *Zippertubing Company, Dept RLC, 8th and S. San Pedro st., Los Angeles.*



Joint Pad Protects Insulation

A method of padding the sharp corners on electrical connectors, particularly suited to locomotive wiring, is illustrated. It saves both time and tape for making a splice or cushioning critical spots. By forming a cross with two pieces of Scotchfil brand insulating putty, the connector is enclosed in a padding of the putty and ready for wrapping.

About 15 per cent of the average time required for insulating splices is saved along with about 50 per cent of the tape normally used. The method also provides a standard which reduces variables in splice quality. *Minnesota Mining & Mfg. Co., Dept. RLC, 900 Bush ave., St. Paul 6, Minn.*

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

DIESEL ENGINES.—8-page two-color booklet, "The Switch to Higher Profit," describes uses of Caterpillar diesel engines on railroads, including crane power, air conditioning and locomotive prime mover, with on-the-job illustrations. (Write: *Caterpillar Tractor Company*, Dept. RLC, Peoria, Ill.)

STAINLESS STEEL. 32-page catalog describes chemical composition, strength factors, physical properties and typical applications for a broad range of stainless-steel types, including the 200, 300 and 400 series. Includes also forging ingots and rolled-in surface patterned stainless steels. (Write: *Advertising Department, Sharon Steel Corporation,* Dept. RLC, Sharon, Pa.)

OXWELD NOZZLES.—12-page folder (Form 1024) describes and illustrates some of the production steps that go into manufacture of Oxweld cutting nozzles. (Write: *Linde Company, Division of Union Carbide Corporation,* Dept. RLC, 30 East 42nd st., New York 17.)

STRADDLE CARRIER.—4-page booklet gives complete specifications and operating advantages of the Series 71 straddle carrier of 12,000-lb capacity. Load height and width, bolster length, inside height and width, overall width and weight given for each of nine models. Sketches illustrate turning radius. (Write: *Ross Carrier Division, Clark Equipment Company,* Dept. RLC, Benton Harbor, Mich.)

SILICONES.—16-page 1958 Dow Corning Reference Guide (Code 1-113) describes over 150 commercially available Dow Corning silicone products. Contains detailed charts, tables, graphs, and data on properties and performance, also illustrated examples on how silicones can cut costs. Cross indexed. (Write: *Dow-Corning Corporation,* Dept. RLC, Midland, Mich.)

GRINDING AND BORING SPINDLES.—8-page booklet illustrates and describes Ex-Cell-O Precision grinding and boring spindles, also a line of standard spindles for use as original equipment by machinery builders or as replacement spindles to improve performance of grinders and boring machines in use. (Write: *Ex-Cell-O Corporation,* Dept. RLC, 1200 Oakman blvd., Detroit 32.)

WELDING SUPPLIES AND ACCESSORIES.—48-page catalog (Form ADC 848B) contains complete information on ferrous and non-ferrous welding rods for oxyacetylene welding and Heliwelding; welding and brazing fluxes and their applications; aluminum welding fluxes; Aircosil silver brazing alloys; brazing alloys; Jackson and Airco protective equipment; Jackson electrode holders and cable connectors; weld cleaning tools; etc. (Write: *Air Reduction Sales Company, a division of Air Reduction* Company, Dept. RLC, 150 East 42nd st., New York 17.)

LUBRICANTS.—16-page booklet, "Brooks E. P. Lubricants," describes a wide range of lubrication jobs and explains use of Brooks E. P. products in solving severe applications. Products detailed as to type and application. Continuing research program also described. (Write: *Brooks Oil Company,* Dept. RLC, 3304 East 87th st., Cleveland.)

SPRAYED METAL COATINGS.—8-page Bulletin 136 contains basic engineering data on wire and powder sprayed coatings of metals and ceramics.

METALLIZING MACHINE.—6-page folder describes the Metco Type K electronic machine for high-speed automatic operation in production, production salvage, or heavy maintenance work. (Write: *Metallizing Engineering Co.,* Dept. RLC, Westbury, L. I., N. Y.)

CLEANER, LONGER LASTING

Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

Even after the most severe freight or passenger operation, engines using Diol RD are exceptionally clean. They show a minimum of carbon deposits in the piston ring zone... very little lacquer or varnish on piston skirts and exhaust valve stems. And Diol RD oils effectively prevent corrosion of the silver wrist pin bushings or alloy bearings.

The good oxidation stability of the base stock in Diol RD oils is bolstered by the detergent-inhibitor additive used. Result: greater mileage between oil changes, with consequent lower costs. For data or technical assistance call your local Esso office or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N. Y. *perfected by research... proved in performance*

DIOL® RD

ESSO

RAILROAD PRODUCTS

—ADVERTISERS IN THIS ISSUE—

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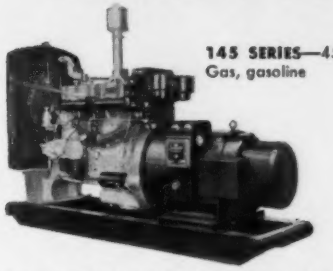
WAUKESHA

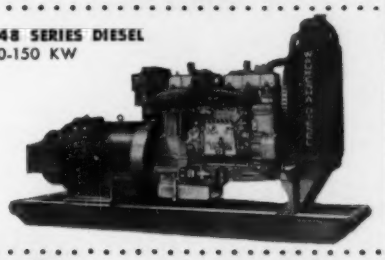


145 SERIES—45-110 KW
Gas, gasoline

Industrial ENGINATORS®

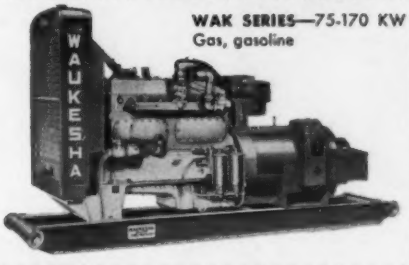
50-800 KW

NATURAL GAS • LPG • GASOLINE • DIESEL

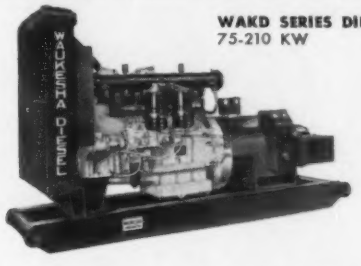


148 SERIES DIESEL
50-150 KW

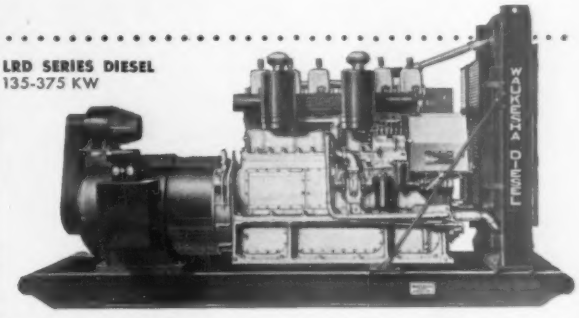
• Who builds these Waukesha Enginators? The same engineering organization who, ever since 1935, have made the Waukesha engine-driven railway equipment that supplies air conditioning and all electrical needs, and is now used by over 40 American railroads and the Pullman Co. For reliable performance on all fuels, these accurately balanced Waukesha engine-generator combinations supply smooth, steady power in continuous, intermittent and standby service.



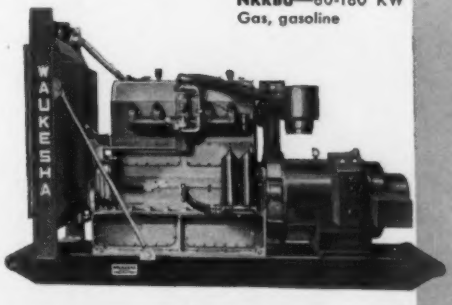
WAK SERIES—75-170 KW
Gas, gasoline



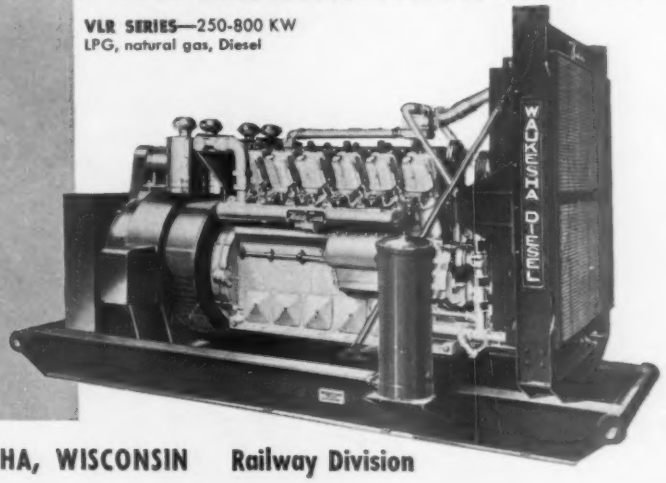
WAKD SERIES DIESEL
75-210 KW



LRD SERIES DIESEL
135-375 KW



NKRBU—80-180 KW
Gas, gasoline

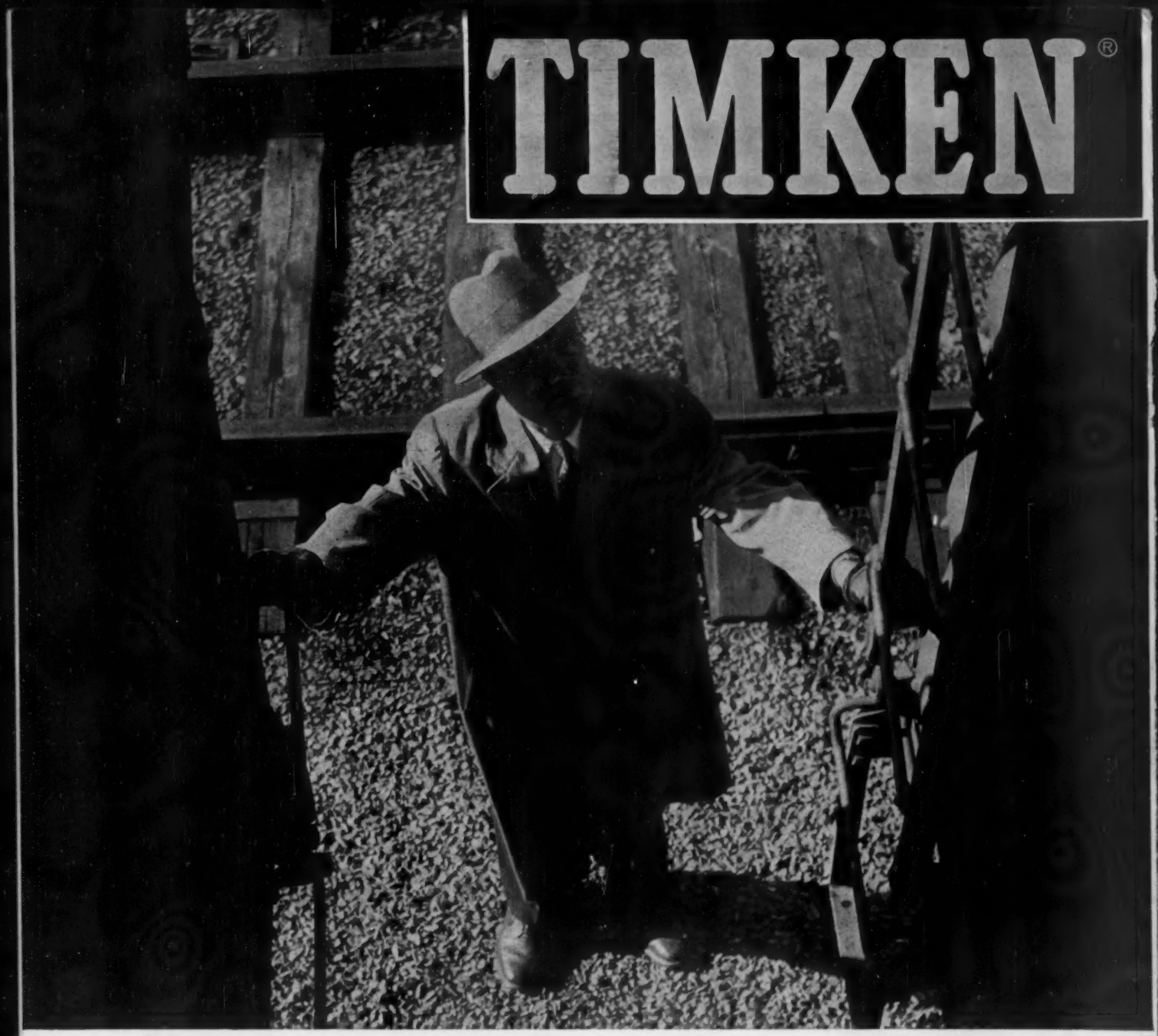


VLR SERIES—250-800 KW
LPG, natural gas, Diesel

WRITE for bulletins for these and other models

335-R

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN Railway Division



"I found substantial progress made toward solving a serious problem", says ACL's Rice

"WHEN I took over as president, I found the Coast Line had made substantial progress toward licking a serious problem—with 7,000 roller bearing cars," says W. Thomas Rice. "Reducing hot box delays helps us get more business. And by sharing a lot of these cars with other railroads, we're helping speed the day when all freight is 'Roller Freight'.

"By putting large numbers of roller bearing cars in interchange, the railroads are investing in their future together. It's the kind of teamwork that's made the railroads grow and prosper.

And even while helping all the railroads, we get most of the benefits from our 'Roller Freight' investment. Besides reducing the hot box problem, it helps us cut inspection time, save lubricant."

When all freight is "Roller Freight", America's railroads will save an estimated $224,000,000 annually in maintenance and operating costs. Tom Rice's ACL and 61 other railroads and private car owners can see that day coming. They've already put more than 24,500 cars on Timken® tapered roller bearings, about ½ of them in interchange.

The taper makes Timken the only bearing that delivers what you expect from a roller bearing. There's no lateral movement to pump lubricant through the seal. Positive roller alignment is assured. Timken bearings cut lubricant cost 95%.

That's why "Roller Freight" is rolling in interchange. Our booklet, "How America's Railroads Can Save $224,000,000 A Year", will tell you more. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".